

CHAPTER IV THE PUNCHEON RUN SITE

A. DESCRIPTION OF THE SITE

The Puncheon Run Site is situated on a peninsula formed by the St. Jones River and Puncheon Run, a small perennial stream that flows into the St. Jones from the west. At this point the St. Jones River is tidal, and the water is oligohaline (very slightly salty). Both north and south of the Puncheon Run peninsula are broad areas of open water. The area to the north is mudflats at low tide, while that to the south, where Puncheon Run meets the St. Jones, is somewhat deeper and bordered by marshes composed of arrow arum, pickerel weed, golden club, and cattails. The peninsula has been truncated by the channelization of the river, so that the easternmost 100 meters (330 feet) of the peninsula have been heavily disturbed and the old point of the peninsula is now an island. The remaining peninsula is 200 meters (660 feet) wide at its eastern end and perhaps 350 meters (1,150 feet) long. Even within this area, an additional 1,800 square meters (0.44 acre) in the northeast corner have been destroyed by borrow pitting.

The easternmost portion of the Puncheon Run peninsula, designated Locus 3, consists of a Coastal Plain upland and a lower-lying terrace of the St. Jones River. The upland is composed of Pleistocene deposits referred to as the Columbia Formation, while the river terrace was probably formed during the late Pleistocene or early Holocene period. The river terrace occupies the easternmost portion of the site, and the majority of its nearly level to gently sloping surface is situated between the elevations of about 3 to 5 meters (9 to 17 feet). The Metate Block (Plate 12) and Feature 30 Block are located here on the river terrace. As much as 2 to 3 meters (8 to 10 feet) of this elevation is gained via scarps along the St. Jones River and Puncheon Run shorelines.



PLATE 12: Metate Block Excavations

Landward, the terrace surface rises gently to the west, where it then joins with the Coastal Plain upland across a moderate (5 to 6%) slope, which climbs to the upland surface elevation of somewhat more than 7 meters (25 feet). This slope spanning the transition between the two landforms covers a lateral range of about 60 meters (200 feet), and within this broad transition zone materials of mixed origin but generally dominated by Columbia sediments are present. Where the upland borders the waters of the St. Jones River to the north or, more extensively, along the Puncheon Run valley to the south, its edges are defined by slopes that steeply fall to the near sea-level elevations of the adjacent waters and wetlands. West of Locus 3, the upland encompasses both Loci 1 and 2, and then continues to range beyond the site limits, where it becomes the principal regional landform. Most of Locus 3 was covered with a secondary-growth forest at the time of the archaeological investigations although it had all been plowed in the past (see Plate 1).

Moving west along Puncheon Run at the southern edge of the site, the picture is more complicated. The broad marsh extends about 400 meters (1,300 feet) up the stream from its mouth, gradually narrowing. As the marsh ends, the floodplain emerges, expanding up to 150 meters (490 feet) in breadth. The floodplain itself is covered with a wetland forest. The floodplain was outside the project area and was not tested for prehistoric remains. The floodplain was separated from the upland of the peninsula by a steep Pleistocene scarp up to 7 meters (25 feet) tall. Occupying the top of the scarp was the area designated Locus 2, about 250 meters (820 feet) inland from the St. Jones and 100 meters (330 feet) from Puncheon Run. Locus 2 encompasses a 2-hectare (5-acre) portion of the site, largely consisting of fallow fields, but with a narrow strip of mature forest along the top of the scarp. Analysis of landscape features and soil profiles suggest that the scarp edge has never been plowed.

Locus 2 straddles a Y-shaped erosional gully that descends steeply from the scarp to the wetland zone adjacent to Puncheon Run. Though termed a “relict stream” in the HRI draft report, this gully appears instead to be a Pleistocene outwash feature, or drainage (see Volume II, Appendix A). This difference is important. While location of a prehistoric site near a “relict stream” would suggest the site was chosen because of its proximity to potable water, as the gully is more likely a drainage, the choice to occupy Locus 2 was probably not based on the immediate availability of water. Nonetheless, occupation of Locus 2 may have been influenced by the drainage cut through the steep sideslope of the bluff. This would have provided a more accessible passage than the steep sideslope overlooking the Puncheon Run floodplain

West of Locus 2, the streambed of Puncheon Run rises, the floodplain narrows, and the scarp shrinks to a gentle bank. This western section of the site was designated Locus 1 and was only slightly elevated above the stream. The Silo Pit, Cobble Bar, and Buried Plowzone areas were located along this portion of Puncheon Run. Overall, the site stretched 1,000 meters (0.6 mile) from east to west, and its total area was about 10 hectares (24 acres). Figure 11 illustrates the principal loci and excavation areas within the site (see map in end pocket).

Separated from the Puncheon Run peninsula by early twentieth-century dredging operations, Locus 4 is presently an island in the St. Jones River. Phase II testing there by HRI yielded no archaeological materials, and further investigations were not undertaken by Berger.

Phase III excavations were focused on five locations within the Puncheon Run Site. The Phase II testing had produced evidence that the site consisted of several distinct activity areas that were quite different from each other in terms of the kinds of artifacts and features found in them. The Phase III fieldwork was designed to sample each of these areas so that they could be compared to each other, investigating the range of activities that had taken place on the site during the period of its occupation. One interesting area, along the bluff edge in Locus 2, was avoided by construction and preserved in place. Further investigations were not undertaken there. The areas that were investigated were the Buried Plowzone area, the Cobble Bar area, and the Silo Pit area, all in Locus 1, and the Metate block and the Feature 30 block in Locus 3.

B. PHASE I AND PHASE II EXCAVATIONS

The Puncheon Run Site was discovered by amateur collectors, and it was formally named and recorded by Wapora, Inc., in 1976. No records of Wapora's investigations have been located, nor have descriptions of their artifacts been found. At least three square soil stains, measuring about 2.5 feet on a side and oriented to magnetic north, were identified by Berger during investigations in Locus 3. These have been interpreted as backfilled test excavations dug by the Wapora team. The first well-documented testing of the site was a Phase I archaeological survey of the Puncheon Run Connector Corridor carried out by HRI in 1995 (Liebknecht et al. 1997). The survey was performed by shovel testing. Transects of shovel tests at 20-meter intervals were begun at the centerline of the highway and extended away from the centerline, perpendicular to the highway's direction at that point (see Figure 11).

HRI's Phase I investigations determined that prehistoric material was present over a broad area, extending along nearly 1,150 meters (3,800 feet) of the Puncheon Run Connector Corridor. For convenience, HRI divided the large site into four loci. Locus 1 contains the western portion of the site on an upland terrace overlooking Puncheon Run. Locus 2 is located on both sides of an intermittent drainage channel east of Locus 1. Locus 3 includes the easternmost portion of the upland terrace from the east side of Locus 2 to the confluence of the St. Jones River with Puncheon Run. Locus 4 was an island in the St. Jones River, east of Locus 3, a former point bar separated from the mainland by the cutting of a new channel early in the twentieth century. No prehistoric materials were identified in Locus 4 and it will not be further discussed.

Phase II testing of the Puncheon Run Site was carried out by HRI later in 1995. HRI's Phase II testing consisted of additional, close-interval shovel testing and the excavation of 1x1-meter and 1x2-meter test units. The units were placed where shovel tests encountered either possible pit features or artifact concentrations. The materials recovered during the testing included prehistoric ceramics, points, and debitage derived from local cobbles. A number of pit features were identified, and some of them were interpreted as pit houses. These pits were found in Locus 3, near the St. Jones, and in Locus 1, near the western end of the site. The shovel testing showed that artifact density across most of the site was low, with higher counts (more than five per shovel test) limited

to the eastern half of Locus 3, a portion of Locus 2 along the bluff edge overlooking the Puncheon Run floodplain, and the western end of Locus 1.

Berger's work at the site began with additional Phase I shovel testing to fill in areas not fully covered by HRI's survey, followed by a program of extended Phase II testing. Berger's approach for the extended Phase II investigations focused on issues of archaeological integrity and on the defining characteristics of the Woodland I microband base camp property type. Archaeological integrity relates to the contexts in which artifacts and features are found, addressing the extent of disturbance to the deposits. Although it was apparent that most of the site had been plowed, the HRI report did not explicitly address the issue of whether substantial artifact deposits were present in unplowed contexts. The definition and refinement of property types is a central component of the state management plan for the Woodland I period (Custer 1994), and the determination of a site type directly hinges on the issue of integrity.

A number of scattered 1x1-meter units were excavated during Berger's extended Phase II work, principally in Locus 3, and the field testing plan included the excavation of 5x20-meter blocks using heavy machinery. The purpose of the machine excavations was to expose large areas of intact subplowzone deposits in order to investigate possible feature remains truncated by plowing, particularly pit house features. Block excavations were placed in areas of high and low artifact density as determined by the results of HRI's Phase I and Phase II work and Berger's supplemental Phase I survey.

The placement of excavation blocks was designed to sample the range of variability within the site, as defined by (1) the distribution of diagnostic artifacts, (2) varying artifact densities, and (3) topographic variables. As the existing model of Woodland I microband base camps suggests that house pits are not always found in association with the highest densities of artifacts within the overall site, the excavation blocks were distributed to sample areas where the previous work had shown high, moderate, and low artifact density.

Based on their Phase I and Phase II investigations, HRI estimated that roughly 300 to 400 pit features were present at the site. HRI's estimate appears to have been based on the identification of pit features in their Phase II units, together with a review of data from recently excavated Woodland I sites in central Delaware. HRI's review (Liebknecht et al. 1997:figure 9.10) included the Carey Farm, Hickory Bluff, Island Farm, Leipsic, Pollack, and Snapp sites, where the density of pit features ranged from 1.2 to 4 per 100 square meters; the six sites in this sample had an average of 2.3 pits per 100 square meters.

Because of the uncertainty regarding the cultural origin of Woodland I pit houses in Delaware (see discussions of settlement patterns and site formation processes in Chapter III, above), Berger designed the Phase II investigations to search for pit houses and other pit features by exposing more substantial areas of subplowzone soil and then subjecting those features to rigorous examination. A backhoe was therefore used to remove the plowzone from 5x20-meter blocks, each of which might be expected to contain two or three pit house features, based on HRI's study. In all, 20 blocks were excavated, 10 in Locus 3 and 10 in Loci 1 and 2. Prior to mechanical removal of the plowzone, at least five 1x1-meter test units, constituting a 5 percent sample of the plowed soils, were excavated

within the block. After the plowzone was removed, these units were excavated into the subsoil until sterile soil was reached. The subsoil was troweled and inspected for features (Plate 13). When possible prehistoric features were identified, they were mapped, and a sample of these features was tested.

This testing of pit features began with the excavation of 1x0.5-meter units in cruciform trenches centered over each feature and continued with a program of scientific tests: flotation recovery to assess the potential for significant organic remains, geomorphological investigations, and soil micromorphology. Soils outside the features were also tested to provide a comparison for the feature soils. These investigations were completed in 1997 and documented in management summary reports (LeeDecker, Holt, et al. 1998; LeeDecker, Jacoby, et al. 1998).

Features identified after stripping the plowzone soils were categorized into three groups: large and small pits, and fire-cracked rock (FCR) clusters. All large pits were excavated as possible pit house-type anomalies according to a methodology developed specifically for this study. This methodology included the excavation of 1x0.5-meter units in cruciform trenches centered over each feature. Within each unit, flotation and soil chemistry samples were retained from each level for future analysis. Although a few features in Locus 3 were treated as possible pit houses (Features 24, 25, and 26) and tested accordingly, none proved to be a convincing example of a semisubterranean residential structure. Berger's findings did not conform to the prevailing model of the Woodland I base camp, as it lacked evidence of pit houses, which are a key feature of that site type in Delaware (Custer 1994). The lack of convincing evidence for pit houses forced Berger archaeologists to reconsider whether the Puncheon Run Site was actually a base camp or an amalgam of site types, and to question the very premise of the existing model as an explanation of observed community structure.

1. Locus 1

HRI excavated 66 shovel test pits and 10 1x1-meter units in Locus 1. Because HRI's shovel tests were unevenly distributed, Berger completed additional survey in this area with shovel tests at 20-meter intervals on a regular grid. The Phase I survey, as well as the ensuing Phase II testing, demonstrated that most of Locus 1 contained only a thin scatter of prehistoric artifacts. Only 265 artifacts were recovered during HRI's investigations (Table 2). Almost all of these artifacts were debitage and fire-cracked rock, with very few diagnostic artifacts.

Moderate artifact densities, up to 16 per shovel test, were found at the far western end of Locus 1 and along the southwestern edge, but in the remainder of the locus artifact density was less than one per shovel test. However, HRI's shovel testing located four possible prehistoric features in the field, and they investigated four of these with 1x1-meter test units. Artifacts were recovered from these features at depths of up to 1 meter. HRI believed that these might be pit houses of the type identified at other Delaware sites by Thomas, Custer, Artusy, and others. The area of highest artifact density, including the shovel test that yielded 16 artifacts, was at the western end of the site.



PLATE 13: Troweling Excavation Block in Locus 3, After Mechanical Removal of Plowzone



PLATE 14: Feature 8, Block 1, Locus 3

Near the center of the locus was a feature that filled the northwest quadrant of Unit 11 and extended beyond it. This feature had a steeply sloping sides and a nearly flat bottom. It extended 50 centimeters below the plowzone, and measured at least 80 centimeters in diameter. Only one artifact, a piece of fire-cracked rock, was recovered from the feature. However, 10 artifacts, eight jasper and chert flakes and two pieces of fire-cracked rock, were found in the plowzone in this unit; although this is not a large number, it is significantly more than was found in any other nearby unit.

Because HRI's shovel tests were unevenly distributed, leaving large gaps in some areas, Berger shovel tested Locus 1 again at regular 20-meter intervals. Berger's testing essentially confirmed the artifact distribution discovered by HRI, with very low densities in most of the locus and an area of moderate artifact density at the western end and along the southwestern side.

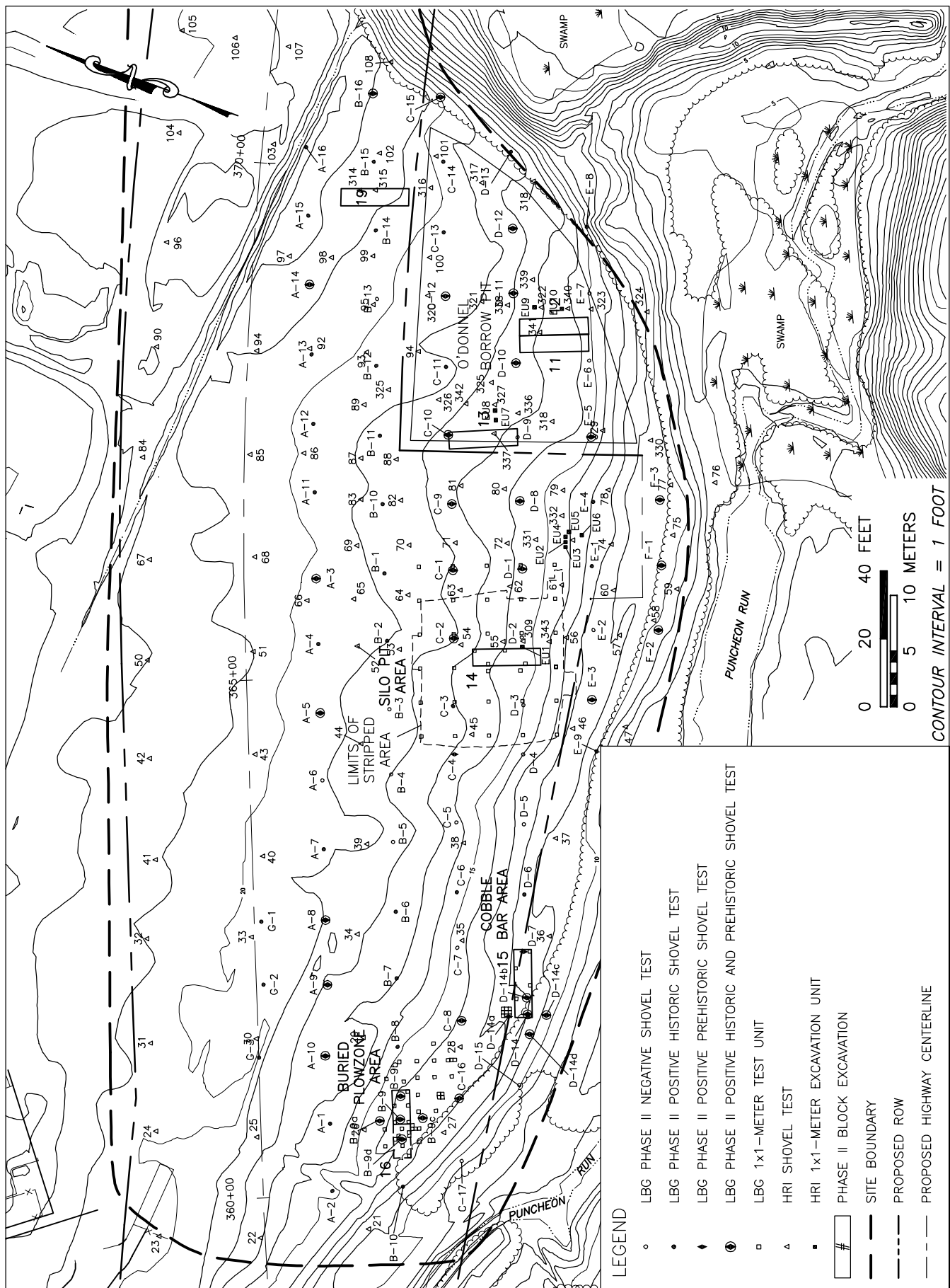
The extended Phase II testing that followed included the excavation of seven 5x20-meter blocks (Figure 12). Blocks 11, 12, 13, and 19 were located in the eastern half of the locus. Blocks 11, 12, and 13 were placed to investigate possible prehistoric features discovered by HRI. Block 19 was excavated in an area of very low artifact density as part of Berger's attempt to investigate the natural and cultural features of the site and develop means for distinguishing between them. Blocks 11 and 12 did not identify any additional features, but they confirmed the existence of one of the features identified by HRI. Because these blocks were located in a proposed borrow pit area, rather than the highway corridor, DelDOT chose not to use the borrow pit, so that the archaeological remains could be preserved. HRI's possible prehistoric feature in Block 13 was not found.

TABLE 2: LOCUS 1 ARTIFACT CLASS FREQUENCIES

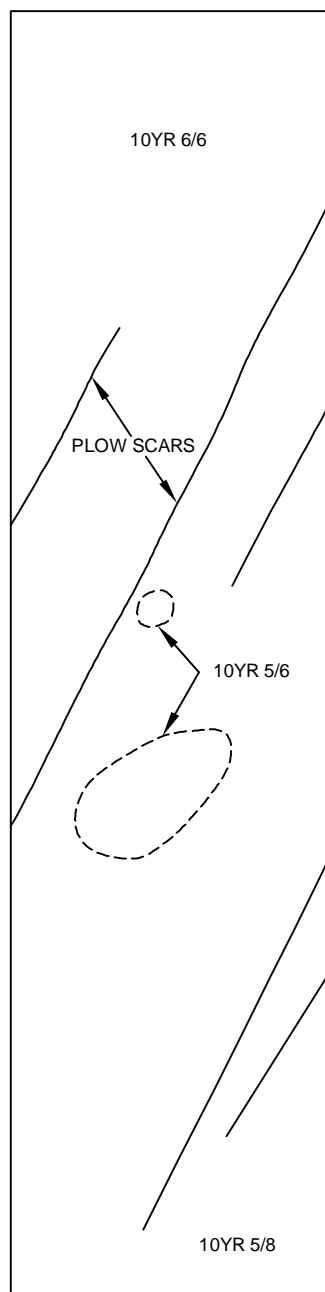
Artifact Class	HRI	Berger	Total
Bifaces	1	13	14
Points	.	10	10
Unifaces	9	5	14
Cores	11	104	115
Cobble tools	.	3	3
Debitage	87	1,344	1,431
FCR	141	254	395
Ceramics	16	53	69
Total	265	1,786	2,051

Phase I testing along the southern boundary of the project corridor, at the edge of the wooded strip along Puncheon Run, recorded high densities ofdebitage, up to 50 per shovel test. These findings led to the placement of Block 15 (Figure 13) in this location during Berger's extended Phase II investigation. Five 1x1-meter units were excavated as a 5 percent sample of the block, with the excavations removing plowzone and first subsoil levels. Following mechanical removal of the remaining plowzone, unit excavation continued until sterile levels were reached. Soil profiles revealed a highly variable and very gravelly series of soil horizons; large cobbles were common throughout the stratigraphic sequence. A thin E-horizon was identified across much of the block beneath the plowzone, with B- and C-horizons displaying a somewhat undulating pattern.

High counts ofdebitage (up to 300 per 1x1-meter unit) were recorded in Block 15, apparently from the procurement and reduction of cobbles in a nearby gravel bar. The block contained an average of about 100 flakes per sample unit, with quartz, jasper, and chert being the predominant raw

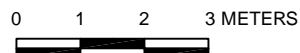


PLAN OF STRIPPED SURFACE AT BASE OF PLOWZONE

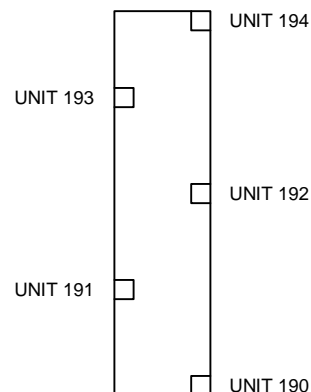


LEGEND

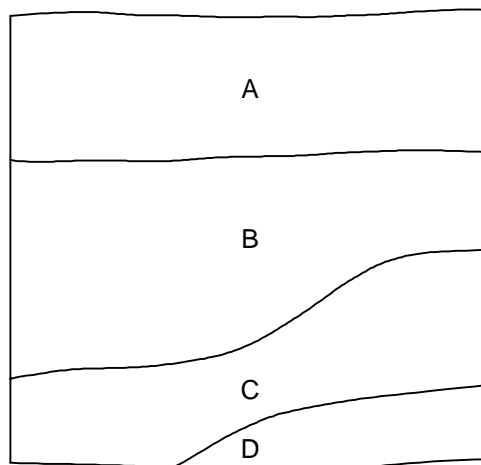
SUBSOIL MATRIX: YELLOWISH BROWN TO
BROWNISH YELLOW (10YR 5/8 - 10YR 6/6)
LOAMY SAND; EB-HORIZON



1x1 METER TEST UNIT LOCATIONS WITHIN BLOCK 15



REPRESENTATIVE PROFILE UNIT 191, NORTH WALL PROFILE



LEGEND

- A BROWN (10YR 4/3) LOAMY SAND WITH GRAVEL; Ap-HORIZON
- B YELLOWISH BROWN (10YR 5/4) LOAMY SAND WITH GRAVEL; EB-HORIZON
- C STRONG BROWN (7.5YR 5/6) LOAMY SAND WITH GRAVEL; B-HORIZON
- D REDDISH YELLOW (7.5YR 6/8) SAND WITH GRAVEL; C-HORIZON

FIGURE 13: Phase II Excavations in Block 15, Locus 1

materials in order of frequency. Almost 200 flakes were recovered in the plowzone and nearly 300 in subsoil levels. Artifact densities were highest in the western half of the block, around Units 190, 191, and 192. Included in the sample were a large number of hammerstones, tested cobbles, and cores from both the plowzone and subplowzone contexts, as well as early- and middle-stage bifaces and utilized flakes. Based on the large amounts of debitage and the presence of cores, staged bifaces, and tested cobbles, this area was interpreted as a quarry workshop area at which quarrying and initial tool reduction activities took place. The gravel bar may have been exposed either directly along the stream, or by tree uprooting and animal burrowing.

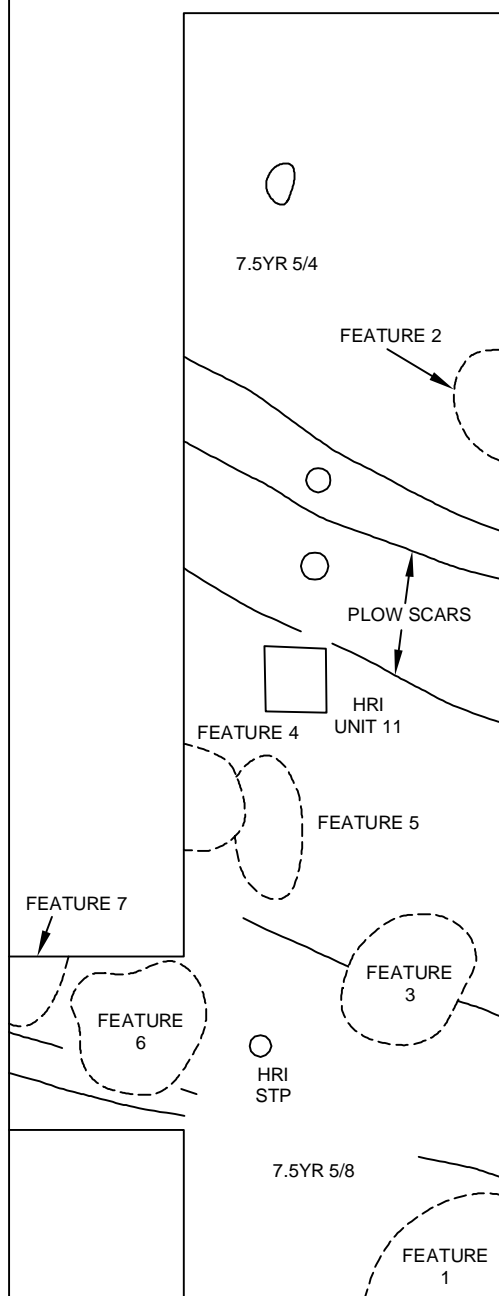
Diagnostic artifacts found in Block 15 plowzone included a jasper Woodland II triangular point and a jasper Woodland I contracting stemmed point. A jasper Woodland I fishtail-like point was recovered in Level 4 of Unit 191. No features were located in the block.

Phase III investigations were carried out adjacent to Block 15 in order to investigate the use of these cobble deposits and their role in the prehistoric settlement of Puncheon Run. This excavation, designated the Cobble Bar area, is described below in Section C.4.

In the far western end of Locus 1, HRI's Phase I testing had identified a plowzone buried beneath colluvial deposits. Artifact density was moderate in this area, but it was promising because of the recovery of possible Hell Island (AD 600 to 1000) ceramic sherds and a late-stage biface resembling a Fox Creek (AD 400 to 900) point. Berger placed Block 16 and proceeded with the standard 5 percent plowzone sample. These units confirmed the presence of the buried plowzone, and they recovered a high artifact density from plowzone and subplowzone levels, with frequencies averaging about 80 artifacts per unit. About 35 prehistoric ceramic fragments were recovered from these five units, including cordmarked sherds tempered with large pieces of quartz that fit into the Wolfe Neck type (700-400 BC), cordmarked, sand-tempered sherds similar to the Hell Island type (AD 600 to 1000), and shell-tempered sherds of the Townsend type (AD 1000 to 1600). A Jack's Reef (AD 600 to 900) argillite pentagonal point and a Woodland II (AD 1000 to 1600) jasper triangular point were also found. Because of the high artifact density and the recovery of diagnostic artifacts from both plowzones, two additional 1x1-meter units were excavated to retrieve more data before plowzone stripping commenced. Mechanical stripping was limited to the eastern half of the block to preserve plowzone contexts for further sampling during anticipated Phase III investigations. Features were not identified on the stripped subsoil surface, although any possible stains may have been masked by the E-horizon soil. To gauge the thickness of this layer, systematic split-spooning was undertaken at 1-meter intervals across the stripped block surface, a technique that had been used successfully to identify features in Locus 3. Coring indicated an undulating E-horizon thickness of between 25 and 40 centimeters below the plowzone, but no features were found. Because of the presence of high artifact densities and diagnostic artifacts, including relatively well-preserved potsherds, Phase III investigations were carried out around Block 16.

Block 14 (Figure 14) was placed over HRI's Unit 11 to investigate the possible prehistoric feature identified in that unit. The five test units in this block yielded a total of only 19 artifacts: 15 chert, quartz, and jasper flakes, one chert tested cobble, and three pieces of fire-cracked rock, all from the plowzone. Removal of the plowzone revealed a number of soil anomalies. However, the feature

PLAN OF STRIPPED SURFACE AT BASE OF PLOWZONE

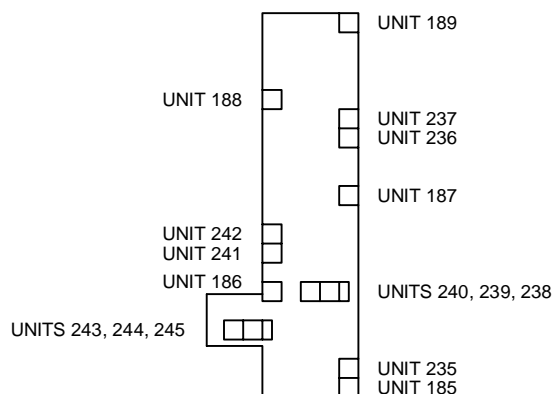


LEGEND

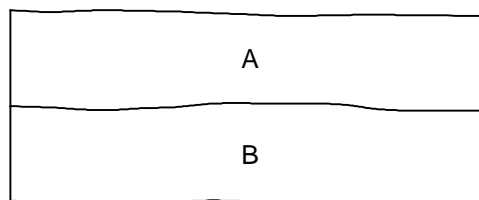
SUBSOIL MATRIX: BROWN - STRONG BROWN
(7.5YR 5/4 - 7.5YR 5/8) SANDY CLAY
LOAM

0 1 2 3 METERS

1x1 METER TEST UNIT LOCATIONS WITHIN BLOCK 14



REPRESENTATIVE PROFILE UNIT 189, WEST WALL PROFILE



0 20 50 CM

LEGEND

A BROWN (10YR 4/3) SANDY LOAM;
Ap-HORIZON

B YELLOWISH BROWN (10YR 5/6) CLAYEY
LOAM; B-HORIZON

FIGURE 14: Phase II Excavations in Block 14, Locus 1

in HRI's Unit 11 was not found; apparently most of it had been excavated, and a small amount of erosion that had occurred around the unit before backfilling must have destroyed the rest.

One of the anomalies identified in Block 14, Feature 6, extended beyond the excavation block to the west, and a 3x3-meter extension was mechanically cleared to expose the entire feature. After striping was complete, five anomalies were investigated using the strategy that had been developed to investigate possible pit house features. This strategy involved excavating trenches of 1x1-meter units across the feature, removing both the soil within the feature and a sample of the surrounding soil. During the course of this testing, no artifacts were recovered from the subsoil.

Two of the anomalies, Features 1 and 2, appeared to be natural disturbances. However, Features 3, 4, and 6 appeared to be cultural pits. The distinction was based on the overall shape of the features and their internal stratigraphy. The suspected cultural pits were all approximately round in plan view, with steeply sloping sides and nearly flat bottoms. They were designated "silo pits." These pits were 80 to 130 centimeters deep. Their stratigraphy consisted of a series of soil layers that had obviously built up from the bottom of the features; that is, the pits had been empty, and had been filled with soil from outside. The suspected noncultural pits had irregular shapes, and the stratigraphies of some showed a jumble of horizontally displaced fills, some resembling pieces of the subsoil, rather than a sequence of vertically ordered fill deposits. Prehistoric artifacts were found in all of the suspected cultural features and in Feature 1, one of the anomalies. The artifacts consisted primarily of debitage, with some fire-cracked rock. An extended description and discussion of the features documented at the Puncheon Run Site is provided in Appendix K, Volume II.

Feature 3 was the largest of the silo pits in the Main Pit Cluster of Locus 1, but its shape and stratigraphy were fairly typical of the others (Figure 15). At the bottom of the feature the sides sloped up very steeply, but the feature widened toward the top, as if the upper portion had been eroded. The uppermost stratum in the feature (Feature Stratum A) composed about the upper three-quarters of the fill and was a yellowish brown sandy loam to loamy sand with very little gravel and few artifacts. Beneath Stratum A were two soil lenses (Feature Strata B and C) confined primarily to the perimeter of the pit and distinguished by a slightly darker color and a slightly higher clay content than Stratum A. They appeared to represent slumping around the edge of the feature. At the base of the pit was a layer of dark yellowish brown sandy clay loam with 5 to 10 percent gravel content (Feature Stratum D). The excavators originally suspected that the dark color of this layer derived from organic matter, but the soil chemistry showed that this was not the case. Stratum D contained no cultural artifacts. It was probably part of the original feature fill, that is, the soil used to bury the bags or baskets of food stored in the pit. Three 2-liter flotation samples from Feature 3 were processed, but they contained little analytically significant material. Hickory nutshell fragments were noted, as well as wood charcoal. Modern (uncharred) seeds were present in all samples. Analysis of the soil chemistry in the feature did not produce any evidence of human activity.

Four radiocarbon dates were obtained from feature fills in Block 14. The three dates from Feature 3 were all very similar: 1,820±80 (Beta-114670), 1,820±80 (Beta-114671), and 1,870±100 (Beta-114672) radiocarbon years before present (BP). A fourth date was obtained from the Feature 6,

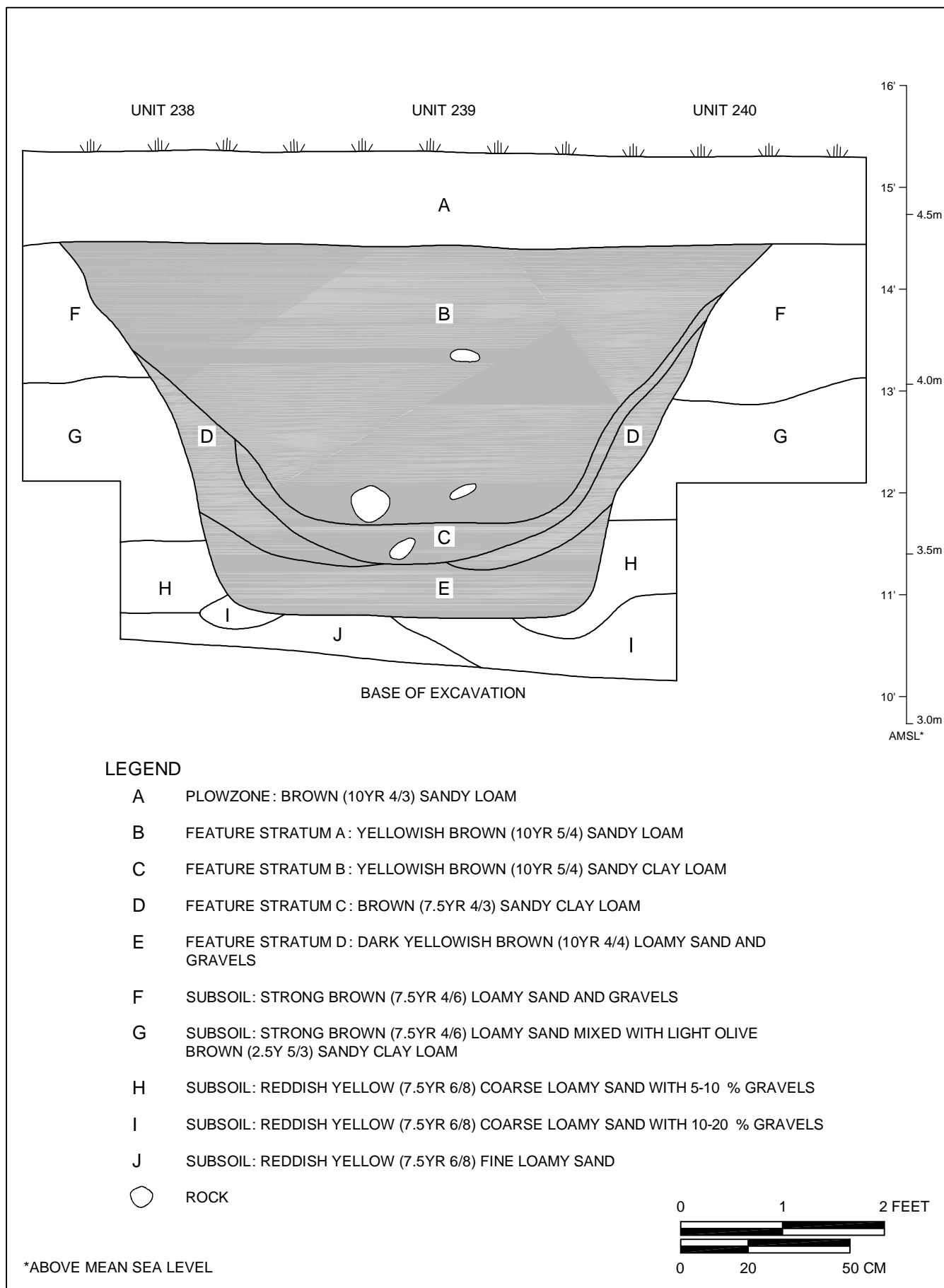


FIGURE 15: Feature 3 (Locus 1), Section View

1,980±60 (Beta-114673). These dates suggested that the features date to the Carey Complex, or Woodland I (Middle Woodland) times.

Because of the presence of a cluster of apparently well-preserved storage pit features in Block 14, this area ultimately became one of the foci for the data recovery, which is discussed in detail below in Section C.2. The first discovery to suggest the potential of the Silo Pit area was an apparent pit feature encountered in one of HRI's Phase I shovel tests (Liebknecht et al. 1997). It is worth emphasizing the chance nature of this find. Very few artifacts were found in this area, and no test units would have been dug if this one shovel test had not happened to be placed on top of an obvious soil anomaly. Besides the tight cluster of cylindrical "silo pits," the Phase III excavations located other possible prehistoric features in the same general area, and it may be that a thin scatter of similar pits was present throughout the locus.

During the Phase I and II investigations of Locus 1, a number of historic artifacts were recovered from shovel tests in the field, including creamware, redware, and bottle glass. One shovel test located what seemed to be a historic feature, containing creamware and machine-cut nails. In addition, one known historic site, the Nixon Mill, was located along this portion of Puncheon Run, just outside the project area. HRI excavated five 1x1-meter units over the possible historic feature. The feature proved to be a ravine that had been filled in with soil from off the site. This fill contained early nineteenth-century artifacts, such as creamware, but also twentieth-century material, such as a bicycle wheel. The only other historic features found in Locus 3 were fenceposts. The thin scatter of historic artifacts in the field probably derived in part from the ravine fill, some of which was incorporated into the plowzone. The remainder of the historic material in the field was simple field scatter.

The Nixon Mill was constructed in about 1790 by Thomas Nixon, a major landowner in the area. The mill served for at least part of its existence as a fulling mill, that is, it was used for mechanically washing woolen cloth. The mill dam was still clearly visible at the time of the excavations; in fact, it clearly shows on project topographic maps. The dam extends north from Puncheon Run, across the floodplain for nearly 120 meters (390 feet), to the bluff edge (see Figure 11). The exact position of the mill itself is more questionable. No foundations were visible adjacent to the dam, and there was no sign of a millrace that would have carried water from the dam to a mill farther downstream. Large timbers that must have been associated with the mill were still visible submerged in Puncheon Run, and these were recorded by HRI through measured drawings. HRI's investigators thought that perhaps the mill had rested on these timbers. Another possibility is that the mill had stood on the north side of the stream, but its foundations had been completely robbed (see Figure 11). Because Nixon's property was all on the north side of Puncheon Run, shovel testing was carried out in the field adjacent to the northern end of the mill dam, to search for a miller's house or other remains that might have been associated with the mill. Two of Berger's 5x20-meter backhoe blocks, Blocks 11 and 12, were also placed in this area. The units in these blocks all yielded historic artifacts. The material included a mix of all periods from the mid-eighteenth century (white salt-glazed stoneware) to recent trash, but no unit yielded more than 15 historic artifacts. The 10 units in these blocks yielded a total of 30 sherds of redware, one sherd of delftware, two sherds of white salt-glazed stoneware, six sherds of creamware, one sherd of pearlware, and 16 sherds of later types.

2. *Locus 2*

The Phase I and Phase II investigations conducted by HRI at Locus 2 included the excavation of 91 shovel test pits and 11 1x1-meter test units. Artifacts were recovered from depths of up to 1 meter, and two possible prehistoric pit features were identified. HRI's Unit 49 revealed a feature extending across the unit width and attaining a depth of at least 95 centimeters. From the section view provided in the HRI draft report (Liebknecht et al. 1997:7-11), it does not appear that the excavators had reached the base of the feature. Details of the feature identified in Units 51 and 55 were not reported.

HRI's Phase II investigations at Locus 2 yielded a total of 585 prehistoric artifacts, largely consisting of fire-cracked rock and debitage, plus a small number of lithic tools (Table 3). Flake types representative of early- to late-reduction sequences were present in the Locus 2 assemblage, indicating that tool manufacture and maintenance activities were carried out there. Jasper was the predominant raw material, accounting for more than two-thirds of the recovered sample, followed by smaller quantities of quartz, chert, and quartzite. Limited frequencies of nonlocal raw materials, including Iron Hill jasper, rhyolite, and argillite, were also recovered. Diagnostic artifacts included what HRI identified as a "narrow-bladed jasper contracting stem projectile point" and six small ceramic sherds identified as Hell Island ware, attributable to the Woodland I period, and a triangular projectile point and a possible sherd of Townsend pottery from the Woodland II period. The triangular point was recovered from a possible pit feature in the wooded area along the bluff edge (Liebknecht et al. 1997).

TABLE 3: LOCUS 2 ARTIFACT CLASS FREQUENCIES

Artifact Class	HRI	Berger	Total
Bifaces	2	6	8
Points	1	8	9
Unifaces	6*	7	8
Cores	10	16	26
Cobble tools	1	1	2
Debitage	286	723	1,009
FCR	271	218	489
Ceramics	6	29	35
Unmodified cobbles	2	5	5
Unmodified pebbles	.	1	1
Total	585	1,014	1,599

*Category "Debitage/edge damage" contains five specimens.

Berger's excavation Blocks 17, 18, and 20 were located near a steeply sloped bluff edge overlooking Puncheon Run and its associated marshy floodplain

(Figure 16). Block 17 was located 25 meters north of the bluff edge, at the southern margin of an abandoned agricultural field. This location was selected as representative of a low artifact density zone based on the results of the Phase I shovel testing. The excavations yielded a low to moderate amount of prehistoric and historic artifacts from the plowzone and an extremely low quantity of both types from the subsoil horizons. Prehistoric artifacts largely consisted of jasper and quartz debitage, together with fire-cracked rock, a small number of flake tools and tested cobbles, one jasper biface, and one quartz-tempered ceramic sherd. Artifact density was notably higher toward the bluff edge.

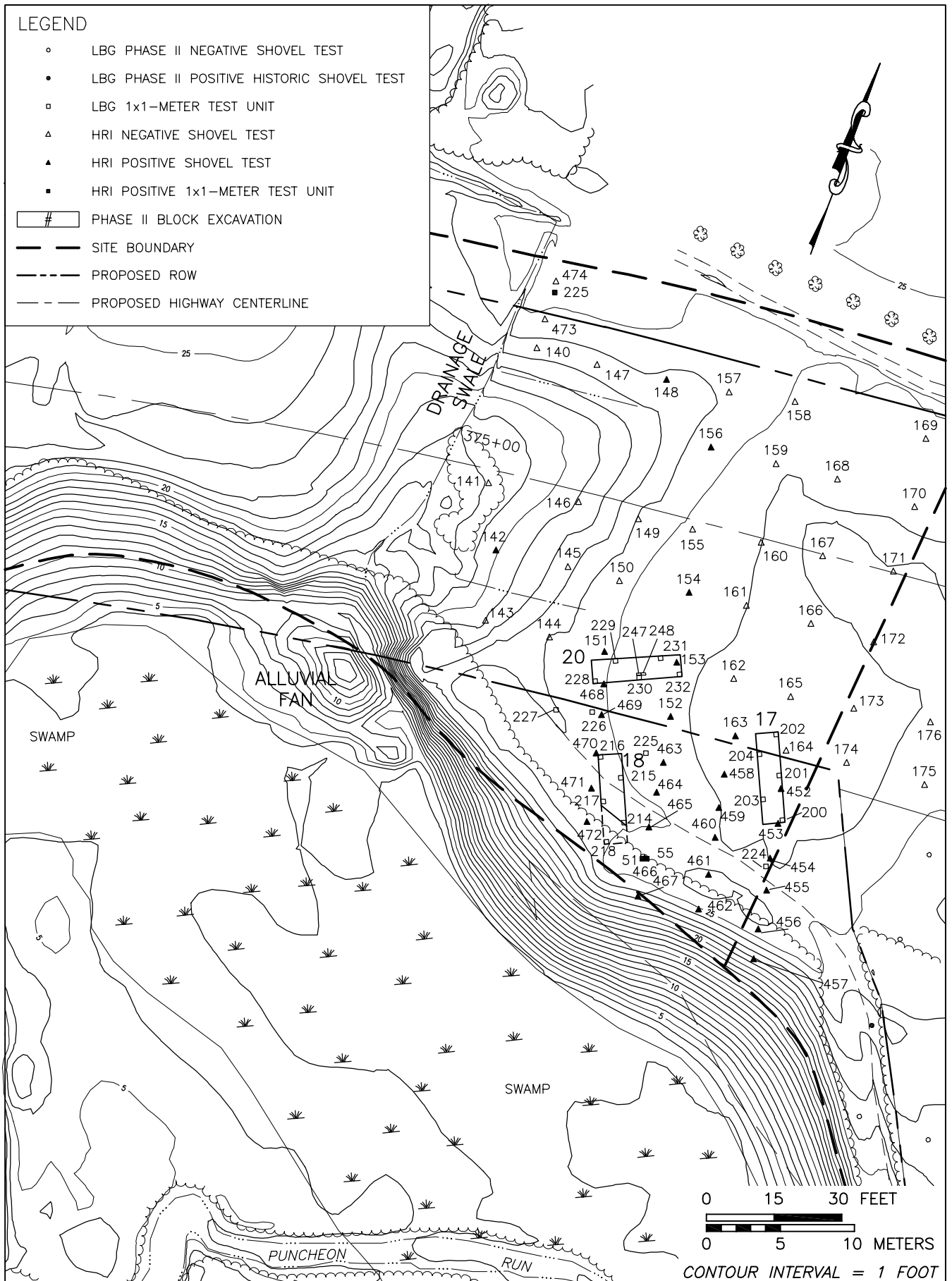


FIGURE 16: Overview of Excavations, Locus 2

Block 18 was located between the bluff edge and the field edge. This wooded location was selected for Phase II investigation as a result of high artifact densities from the Phase I survey, which included the recovery of Hell Island ceramics (Woodland I) and a triangular projectile point (Woodland II). The potential for intact soil horizons in unplowed contexts was also recognized. Within Block 18, Unit 218 encountered undisturbed soil horizons at the southern margin of the block, closest to the bluff edge, and was excavated to sterile soil at a depth of 80 centimeters below ground surface. Surface stripping was not undertaken in the southern third of the block to preserve the intact soils. The Unit 218 stratigraphy consisted of E-, Bw-, and Bt-horizons mantled by a thin layer of A-horizon organic material. The hand-excavated sample in Block 18 yielded a very high density of lithic debitage, ceramics, and fire-cracked rock from the plowzone and significant concentrations of artifacts in the upper subsoil levels. In Unit 218, artifacts were recovered from Levels 1-6, with the highest densities recorded in Levels 2 and 3. Lithic material from the block was mostly jasper and quartz, with small amounts of chert and quartzite recorded. A concentration of quartz debitage was recovered from the Unit 214 plowzone. The ceramic sample was largely retrieved from plowzone contexts and is characterized by quartz temper with cordmarked treatment on some specimens. Five sherds were identified as Hell Island (circa AD 600 to 1000). Tools recovered from Block 18 include a biface, a core, a possible hammerstone, three fragmentary projectile points, and four utilized flakes. Of particular note is a small, well-thinned projectile point recovered from Unit 214

plowzone. Manufactured from chert, this specimen exhibits blade-edge serrations and basal grinding and appears to be a Kirk notched point, dating to between 8000 and 6900 BC (Broyles 1971:65; Coe 1964; Dent 1995:158;).

Six utilized flakes were recovered from Locus 2, four of them from Block 18, and these flakes were all subject to microscopic use-wear analysis (see Appendix G). (HRI also identified two possible utilized flakes in this area.) All of the flakes had seen relatively heavy use, at least three of them on a hard material. A variety of activities are suggested by this kind of wear and include animal butchering and the manufacture of tools, ornaments, or other items from bone, antler, or wood.

Block 20 was located in the abandoned agricultural field at a location chosen to investigate an area of low artifact density with regard to potential subplowzone cultural features. Results from the units indicated a low-density scatter of prehistoric and historic artifacts in the plowzone, and an extremely low prehistoric density in the subsoil contexts. The only lithic tool from Block 20 was a small jasper side-notched point recovered from Unit 237; it is not diagnostic but is similar to those recovered from Woodland I contexts at Carey Farm (Custer, Watson, and Silber 1996:81, 41). Plowzone stripping in Block 20 revealed several small stains interpreted as historic posts. A larger, ovoid stain measuring approximately 1 meter in diameter was designated Feature 1. Bisection excavation of the feature revealed an irregularly shaped depression that has been interpreted as a possible animal burrow.

A flotation sample from Feature 1 contained a small amount of wood charcoal and nutshell, as well as non-native and modern (uncharred) seeds. Soil chemistry samples from the feature fill had elevated levels of phosphorous and organic matter, which may be related to the identification of the feature as a rodent den (see Volume II, Appendix L for discussion of soil chemistry associated with a groundhog den).

Four units were excavated by students from the North Smyrna Elementary School and the J.B. Moore Middle School in Smyrna. Prehistoric artifact densities were moderate and were composed largely of jasper, quartz, and chert debitage. Nearly all artifacts were recovered from the plowzone. Historic artifacts were recovered in low to moderate frequencies and generally consisted of curved and architectural glass, whiteware, nails, and brick.

As the investigations in Locus 2 demonstrated some of the most intact areas of the Puncheon Run Site were located just outside the proposed roadway alignment, recommendations were developed for *in situ* site preservation of this area.

3. Locus 3

HRI's excavations in Locus 3 consisted of 244 shovel test pits and 33 1x1-meter and 1x2-meter test units. Although fewer than 50 diagnostic artifacts were recovered during the previous Phase II testing, some variations in their distribution were apparent. In general, Woodland II diagnostics were concentrated in the northern part of the site close to the St. Jones River, while Woodland I diagnostics were more broadly distributed. HRI's test excavations demonstrated the presence of prehistoric material from depths of up to 1 meter; but of greatest interest was HRI's finding of several possible pit features resembling the pit house type. These pit features exhibited a broad variety in their size and morphology. A feature exposed in Unit 11, a 1x2-meter excavation, was approximately 1.5 meters across and 50 centimeters deep, with steep sides and a flat bottom. A feature in Units 24 and 56 was more than 2 meters wide, spanning the entire excavation. It included two components, a broad area with a flat bottom approximately 40 centimeters deep and a basin-shaped pit in the center, 60 centimeters in diameter, extending 20 centimeters below the rest of the feature. This feature resembled those designated pit houses at a number of Woodland I and

Woodland II sites in northern Delaware (Custer 1994; Thomas 1981), including the Hickory Bluff Site located in the project corridor on the eastern bank of the St. Jones River (Liebknecht et al. 1997).

During the Phase I and Phase II investigation of Locus 3, HRI recovered a total of 2,651 prehistoric artifacts, primarily lithic debitage (Table 4). A wide range of flake types were present, from cortical flakes to small bifacial thinning flakes, indicative of the full sequence of tool manufacture and maintenance activities. Nonlocal lithic materials included Iron Hill jasper, rhyolite, steatite, argillite, and Cohansey quartzite. Diagnostic artifacts recovered included what HRI identified as "narrow-

TABLE 4: LOCUS 3 ARTIFACT CLASS FREQUENCIES

Artifact Class	HRI	Berger	Total
Bifaces	13	65	78
Points	9	71	80
Unifaces	38*	40	45
Cores	42	128	170
Cobble tools	2	27	29
Groundstone tools	.	1	1
Debitage	1,221	12,498	13,719
FCR	1,263	2,428	3,691
Minerals	3**	12	15
Ceramics	60	409	468
Total	2,651	15,679	18,330

* Category "Debitage/edge damage" contains 33 specimens.

** Classified as steatite.

bladed, stemmed, corner-notched and Fox Creek types, all of which can be dated to the Woodland I Period” (3000 BC-AD 1000). Ceramics include Wolfe Neck (700 to 400 BC), Wilgus (100 BC to AD 100), Mockley (AD 100 to 450), and Hell Island wares (AD 600 to 1000) from the Woodland I period, as well as Townsend and Killens from the Woodland II period (AD 1000 to 1600) (Liebknecht et al. 1997). A noteworthy find was a ceramic pipe stem fragment, identified as Contact period (mid- to late seventeenth century AD).

Berger began work in Locus 3 with the excavation of additional shovel tests to fill in gaps in the HRI shovel testing coverage. As a result, a small, low-density concentration of prehistoric artifacts along Puncheon Run was located in the western half of the survey area. In the eastern half of Locus 3, Berger found a broad scatter of prehistoric artifacts. A thin scatter of historic material, consisting largely of coal, clinker, brick, whiteware, nails, and bottle glass, was noted throughout the survey area. This material is believed to represent field scatter associated with known nineteenth- and twentieth-century farms in the vicinity and was not considered a significant cultural resource.

Berger excavated 90 1x1-meter test units in Locus 3 during the Phase II investigations, of which roughly two-thirds were within 10 5x20-meter blocks. Based on the comparative data compiled by HRI, roughly two dozen pit house features should have been identified during the investigation of the 5x20-meter blocks. Only a few possible features of this type (Features 24, 25, and 26 in Block 4) were identified and treated according to the protocol developed to examine possible pit houses, but none proved to be a convincing example of a semisubterranean residential structure.

Berger’s Phase II work plan for Locus 3 included a total of 10 5x20-meter excavation blocks, of which three were allocated to the northeastern portion of the site (Figure 17), in an area of relative high artifact counts and diagnostics from both the Woodland I and Woodland II periods. This area also included a possible pit house identified by HRI. Two blocks were allocated to the east-central portion of Locus 3, where previous work had demonstrated the highest density of prehistoric artifacts at the site. One block was allocated to the south-central portion of the locus, where a concentration of Woodland I ceramics was identified. One block was allocated to the southwestern corner of the locus, along Puncheon Run. Moderate artifact counts were recorded in this area, and it was thought that the prehistoric occupation in this area might differ from that of the areas along the St. Jones River. The remaining three blocks were reserved for inland areas.

Although no convincing examples of semisubterranean pit houses were identified, Berger’s work documented several concentrations of fire-cracked rock that appeared to be intact hearth features, all in the northeastern portion of the site. A deep storage pit and a number of lithic workshop areas were also identified. During the Phase II work, several hearth features and one cluster of lithic knapping debris were excavated. Flotation samples taken during the Phase II investigations generally contained little analytically significant material, so other avenues for investigating prehistoric subsistence were explored during the Phase III work. One interesting finding of the Phase II studies was patterning of soil chemistry in feature contexts. In particular, some contexts had elevated strontium levels, about twice the levels found in nearby soils not within the core of the site. It was hypothesized that the distribution of strontium was related to the higher concentration of strontium in sea water than in fresh water, which led to more exhaustive studies of geochemistry and

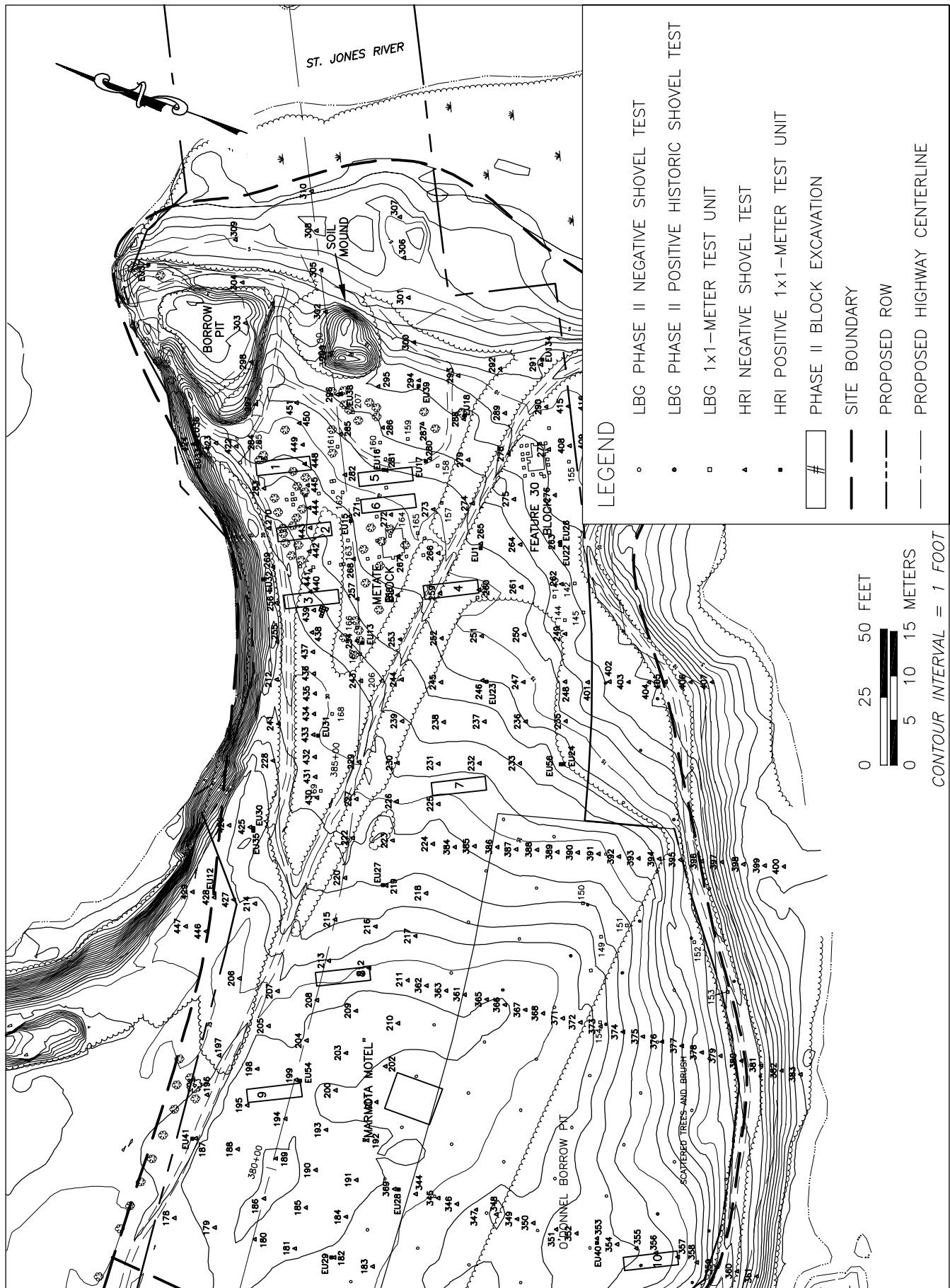


FIGURE 17: Overview Excavations, Locus 3

fishing during Phase III (see Volume II, Appendices A and I). The results of the extended Phase II investigation of Locus 3 are outlined below and provided in detail in the management summary document (LeeDecker, Holt, et al. 1998).

Blocks 1, 2, and 3 were excavated in the northeast portion of the locus, adjacent to the bluff edge overlooking the St. Jones River. This part of Locus 3 was selected for investigation as representative of high artifact density areas with well-drained soils adjacent to a major water source. Two fire-cracked rock clusters, Features 7 and 8 (Plate 14), were exposed immediately below the plowzone in Block 1, and may have been truncated by plowing. In Block 2, plowzone concentrations of debitage and fire-cracked rock were noted in two of the units, and three fire-cracked rock and/or cobble cluster features (Features 9, 10, and 11) were identified upon removal of the plowzone (Figure 18).

The western edge of Block 3 (Figure 19) abutted a cluster of four HRI Phase II units, where two features had been identified, a scatter of hearth rocks and a possible pit house. Because of the proximity of the possible pit house, Berger excavated additional units in Block 3, beyond the standard 5 percent sample. No evidence of the pit house feature was found in Block 3, but the fire-cracked rock scatter extended into Block 3, and it was identified as Feature 15. During Phase III, additional investigations of the possible pit house feature were completed (see Section E.4 below).

Three other features were identified in Block 3. Feature 13 was a shallow, circular pit containing mixed prehistoric and historic artifacts, including coal fragments, an oyster shell, and a single flake. Feature 14 also exhibited a circular pit-shaped outline, but was subsequently identified as a modern bioturbation. Feature 16 consisted of a large fire-cracked rock cluster, which was excavated in two parts, 16A and 16B (Plate 15).

Block 4 (Figure 20) was located due south of Block 3 in an area chosen for investigation because of the recovery of diagnostic prehistoric ceramics during HRI's excavations. A number of features were identified in this block and were subjected to intensive testing. Feature 1 appeared as an ovate stain approximately 3 meters across, flecked with charcoal and very small fragments of decayed bone. Feature 2 was investigated as a possible pit but determined to be a decayed tree stain. Feature 1 was initially interpreted as a possible pit house feature; however, closer examination during excavation revealed two shallow basins (Features 1A and 1B). One interesting observation can be made regarding Feature 1, in terms of its soil chemistry; it was the only feature with a significantly high ratio of zinc to copper, which has been identified as a possible indicator of decayed bone and by extension, human burials (Beard et al. 2000). In the absence of other information that would support interpretation of this feature as a burial pit, or *chiacosan*, its function remains open to interpretation.

Three large, possible pit features (Features 24, 25, and 26) were exposed after removal of the plowzone and underlying E-horizon. An extension to the west side of Block 4 was required to fully expose Features 24 and 26. Initially these features were observed as a single large feature approximately 2.5 meters in length. After fully exposing the surface at the base of the E-horizon,



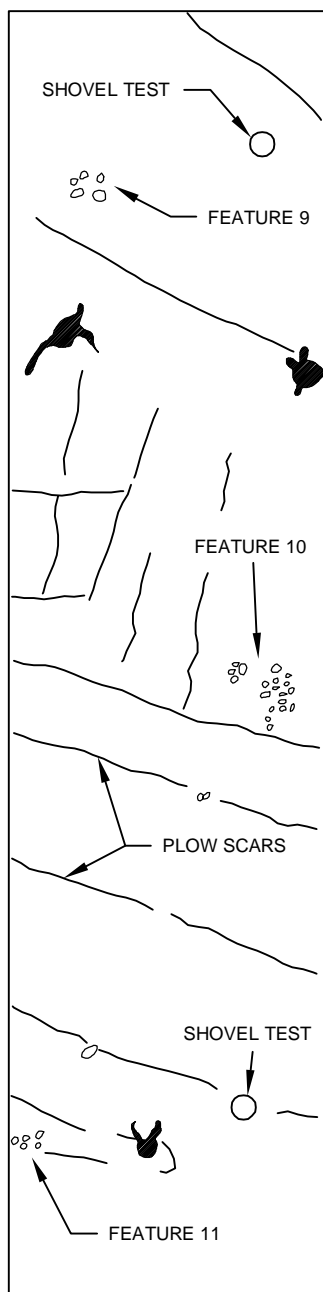
PLATE 15: Features 16A and 16B, Block 3, Locus 3

however, two distinct anomalies (Features 24 and 26) were apparent. To the south, Feature 24 was mapped as a large pit stain partially truncated by Feature 26 to the north. Cross-trenching of Feature 24 (Figure 21) revealed a well-defined pit-shaped outline, measuring approximately 100 by 135 centimeters in plan and 35 centimeters in depth. Very few artifacts were recovered, and there was no analytically significant macrobotanical material. Feature 24 seems to be a small cultural pit, but this interpretation is not certain.

Feature 26 exhibited a ring-shaped outline in plan, with an organic, stained interior and a leached circular zone around the perimeter. In section, Feature 26 exhibited highly irregular boundaries and organic root staining interpreted as a large tree disturbance. Feature 25 was visible in plan as an irregular, roughly ovate soil anomaly consisting of E-horizon-type feature fill intruding into undisturbed B-horizon matrix. Cross-section excavation of the feature revealed an irregular form and stratigraphy that is most easily explained as a large animal burrow.

Blocks 5 and 6 were situated south of Blocks 1 and 2, approximately 50 meters from the bluff overlooking the St. Jones River. This area was selected for investigation because it represented a high density area more than 50 meters from a major water source. Two features were identified in Block 5. Feature 5 consisted of a small, diffuse fire-cracked rock cluster, of which the upper portion had been disturbed by plowing. Feature 6 was recorded as a possible prehistoric pit feature but was determined to be a decayed or burned tree after partial excavation.

PLAN OF STRIPPED SURFACE AT BASE OF PLOWZONE



LEGEND

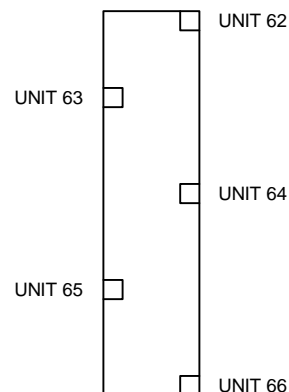
FEATURES 9, 10, AND 11: FCR CLUSTERS

SUBSOIL MATRIX: YELLOWISH BROWN (10YR 5/8)
LOAMY SAND; E-HORIZON

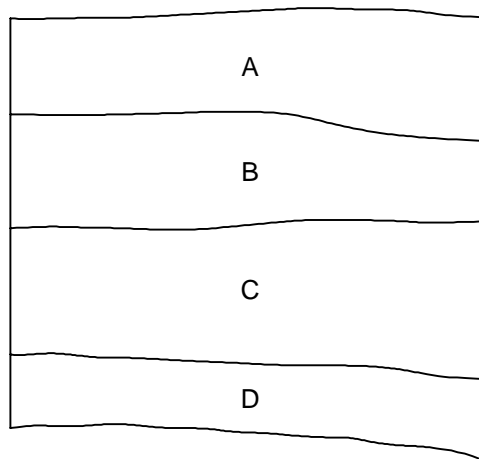
0 1 2 3 METERS



1x1 METER TEST UNIT LOCATIONS WITHIN BLOCK 2



REPRESENTATIVE PROFILE UNIT 62, WEST WALL PROFILE



0 25 50 CM



LEGEND

A PALE BROWN (10YR 6/3) LOAMY SAND; AP-HORIZON

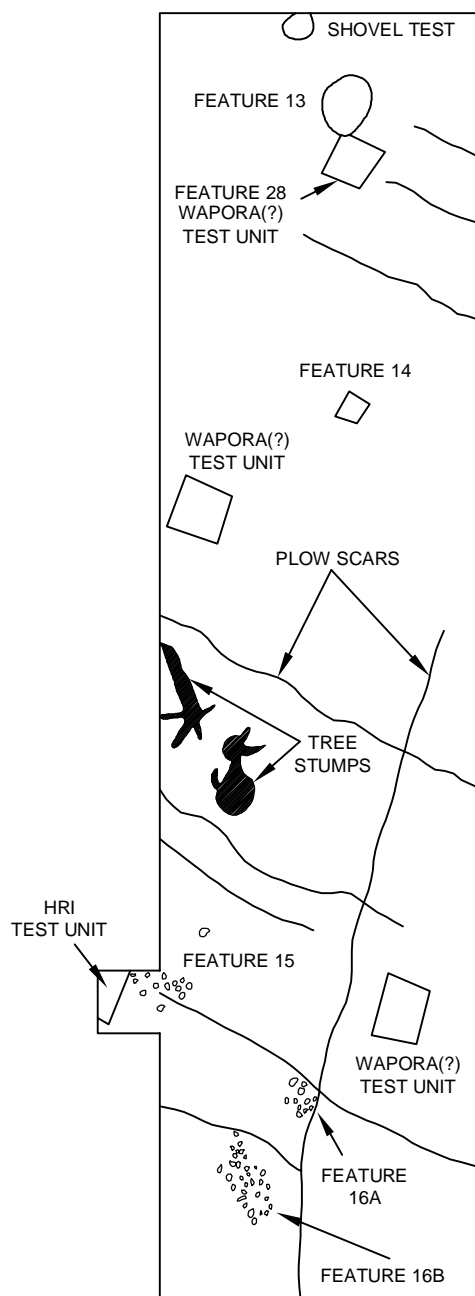
B VERY PALE BROWN (10YR 7/4) SANDY LOAM;
E-HORIZON

C BROWNISH YELLOW (10YR 6/8) SAND LOAM;
B-HORIZON

D YELLOW (2.5Y 7/6) LOAMY SAND; C-HORIZON

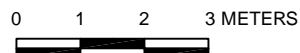
FIGURE 18: Phase II Excavations in Block 2, Locus 3

PLAN OF STRIPPED SURFACE AT BASE OF PLOWZONE

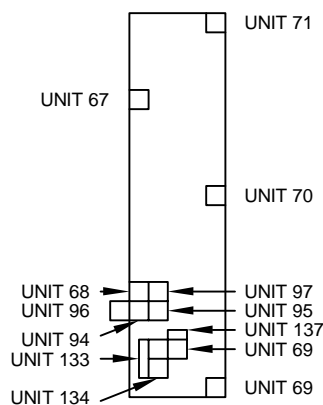


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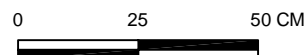
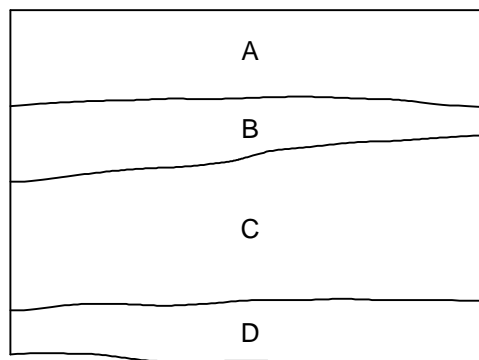
FEATURE 13: OLIVE BROWN (2.5Y 4/4) LOAMY SAND
 FEATURE 14: DARK YELLOWISH BROWN (10YR 3/4) LOAMY SAND
 FEATURE 15 AND 16: FCR CLUSTERS
 SUBSOIL MATRIX: BROWNISH YELLOW (10YR 6/6) LOAMY SAND; E-HORIZON



1x1 METER TEST UNIT LOCATIONS WITHIN BLOCK 3



REPRESENTATIVE PROFILE UNIT 67, WEST WALL PROFILE



LEGEND

- A DARK YELLOWISH BROWN (10YR 4/4) SANDY LOAM;
Ap-HORIZON
- B YELLOWISH BROWN (10YR 5/6) LOAMY SAND;
E-HORIZON
- C YELLOWISH BROWN (10YR 5/8) LOAMY SAND;
B-HORIZON
- D REDDISH YELLOW (7.5YR 6/8) SAND AND GRAVELS;
C-HORIZON

FIGURE 19: Phase II Excavations in Block 3, Locus 3

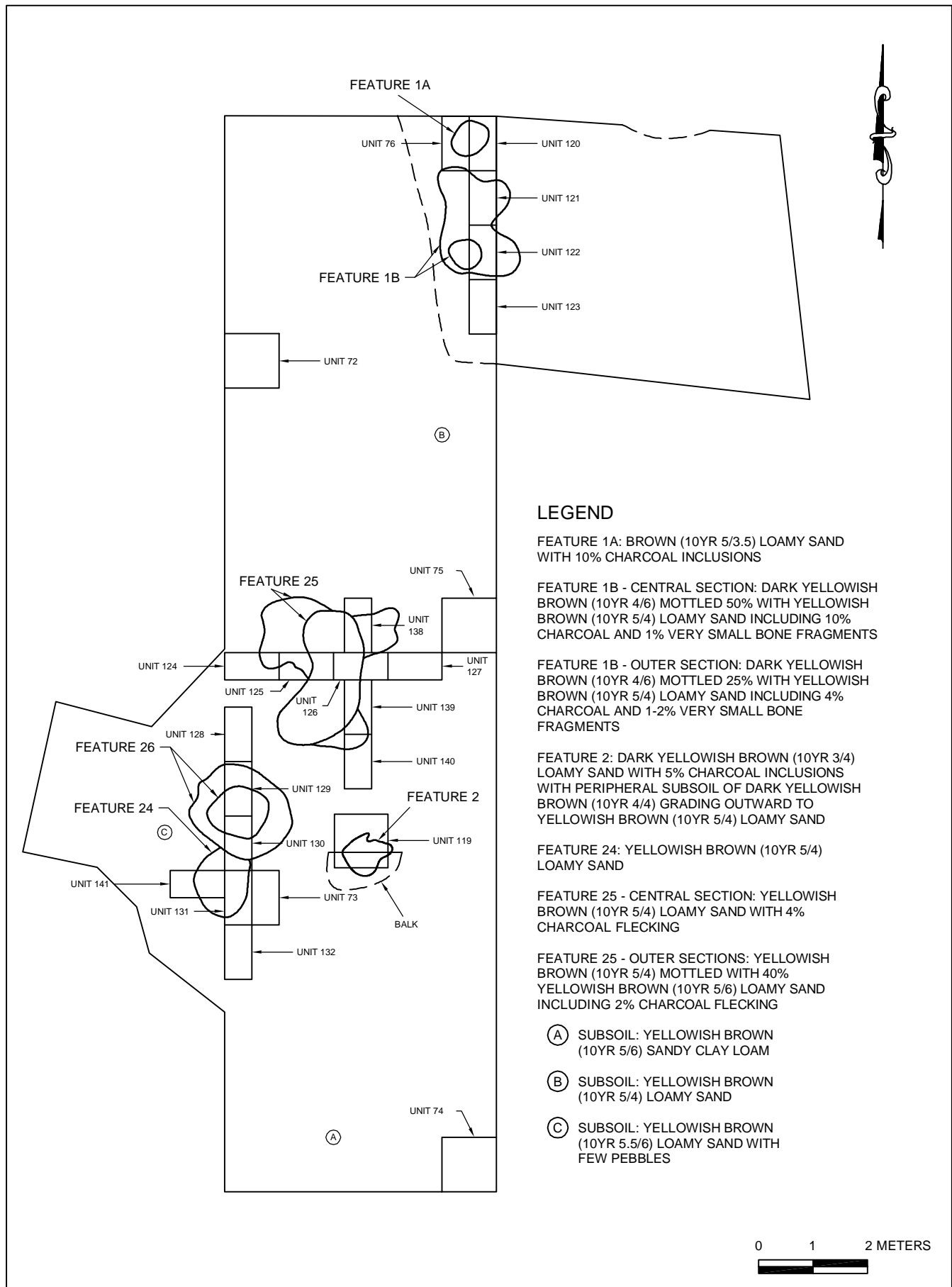
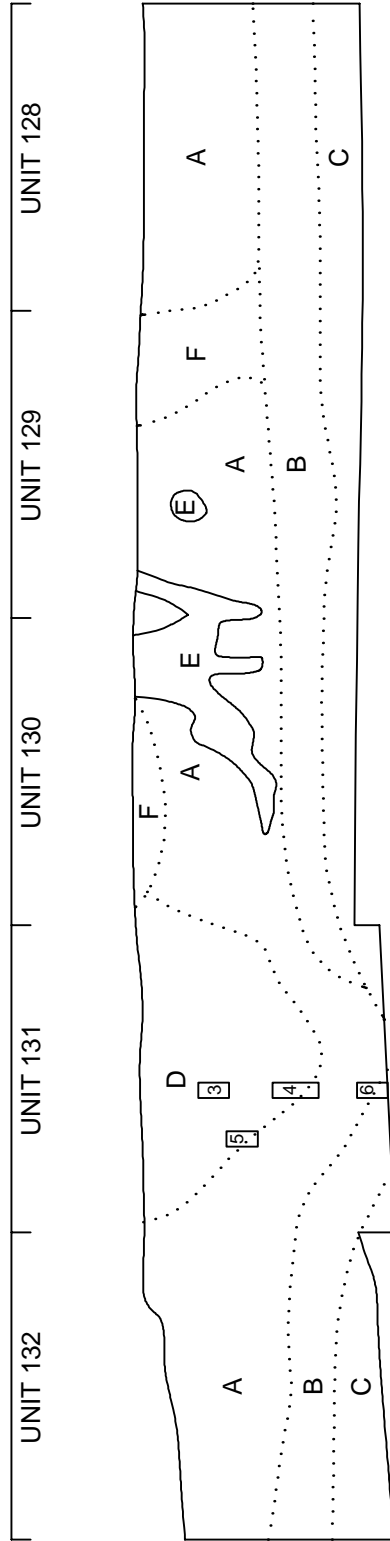


FIGURE 20: Phase II Excavations in Block 4, Locus 3

UNITS 128 - 132
WEST WALL PROFILE



LEGEND

- A DARK YELLOWISH BROWN (10YR 4/6) LOAMY SAND; STRATUM C, B-HORIZON
- B BROWNISH YELLOW (10YR 6/6) LOAMY SAND; STRATUM D, C-HORIZON
- C BROWNISH YELLOW (10YR 6/6) LOAMY SAND; STRATUM D, C-HORIZON WITH GRAVEL
- D FEATURE 24 - YELLOWISH BROWN (10YR 5/6) LOAMY SAND
- E FEATURE 26 - DARK YELLOWISH BROWN (10YR 4/4) LOAMY SAND; INTERIOR OF FEATURE, DONUT HOLE?
- F FEATURE 28 - YELLOWISH BROWN (10YR 5/6) LOAMY SAND; RING OF FEATURE, DONUT?
- 3 SOIL MICROMORPHOLOGY SAMPLE PR 97 3
- 4 SOIL MICROMORPHOLOGY SAMPLE PR 97 4
- 5 SOIL MICROMORPHOLOGY SAMPLE PR 97 5
- 6 SOIL MICROMORPHOLOGY SAMPLE PR 97 6

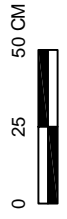


FIGURE 21: Features 24 and 26 Section View, Block 4, Locus 3

Investigation of Block 6 revealed moderate concentrations of prehistoric artifacts and two features below the plowzone. Feature 3 was bisected as a possible pit, but it was determined to be a relatively modern rodent disturbance. Feature 4 was a small chipping cluster containing cores, staged bifaces, tested cobbles, and debitage. This feature was excavated during Phase II; additional discussion of Feature 4 is provided below in Section E.4.d.

Blocks 7, 8, and 9 were excavated in the open field area west of Block 4. These blocks were selected as representative of low artifact density areas located more than 75 meters from water. Investigation of Block 7 confirmed the low density of artifacts on this area, and stripping of the plowzone revealed only one soil anomaly, a tree burn (Feature 17). Block 8 also demonstrated a low artifact density in this area of the site, and no features were identified in subsoil contexts. Block 9 was placed close to the most elevated point in Locus 3, near the center of the open field. Test excavations yielded the lowest counts of any block in Locus 3, and two historic posts (Features 18 and 19) were the only features exposed beneath the plowzone.

Block 10 was situated near the edge of a low bluff overlooking Puncheon Run to the south, where shovel testing had revealed moderate artifact counts. Two features were identified (Features 20 and 27), both of which were determined upon excavation to be tree-related.

In addition to the block excavations, a series of dispersed 1x1-meter test units were excavated in other areas of Locus 3 to sample small artifact concentrations identified during shovel testing, and to investigate the soil stratigraphy in other sections project area. Dispersed test units excavated in the proposed borrow pit area (Units 149-154) typically encountered historic slope wash deposits mixed with the plowzone, and most prehistoric deposits were present in these slope wash and plowzone contexts.

Dispersed units in the eastern part of Locus 3 were primarily intended to map the extent of the subplowzone cultural deposits identified within Blocks 1 through 6. The units identified intact subplowzone deposits existing over much of the eastern part of Locus 3, east of Block 4. A few features were identified in the dispersed units, including Feature 29 in Unit 163, and Feature 30 in Unit 156. Feature 29 was identified as a charcoal flecked area containing mottled organic soils in the southwest corner of the unit; it was ultimately determined to be a rodent disturbance. Feature 30 was first identified at the base of the E-horizon contrasting against the yellowish brown B-horizon. The feature consisted of a steep-sided pit partially exposed in the southeast corner of the unit. Because this was the only deep pit feature identified in Locus 3, it was included in the data recovery program. A discussion of the investigation of the Feature 30 block is provided below in Section E.3.

C. EXCAVATIONS IN LOCUS 1

1. *Introduction*

Three separate areas were excavated in Locus 1: the Buried Plowzone area, the Cobble Bar area, and the Silo Pit area. The Buried Plowzone and Cobble Bar areas were located in the western portion of the locus, where artifact densities were moderate. Excavation of the Cobble Bar area was

intended to investigate a concentration of lithic debitage, tested cobbles, staged bifaces, and hammerstones that seemed to be related to quarrying activity carried out in the gravel bars along Puncheon Run. The Buried Plowzone area included similar deposits, as well as a concentration of ceramics and tools, suggesting a short-term residential camp. The central and eastern portions of Locus 1 had very low densities of prehistoric artifacts, but investigations by HRI and Berger showed that a number of pit features were distributed across this area; hence, the name Silo Pit area was applied. Fieldwork in the Silo Pit area focused on excavation of a cluster containing about a dozen pit features to determine whether they were cultural or natural in origin, and if cultural, to ascertain their possible functions. These pits are believed to have been used roughly from AD 1 to 400.

2. Excavations in the Silo Pit Area of Locus 1

The Silo Pit area was located on gently sloping ground about 50 meters (165 feet) north of Puncheon Run. As noted earlier, the first discovery to suggest the potential of the Silo Pit area was the chance apparent pit feature in one of HRI's Phase I shovel tests (Liebknecht et al. 1997). Very few artifacts were found in this area, and it would not have been investigated further if the shovel test had not been placed on top of an obvious soil anomaly. To investigate this anomaly, HRI opened a 1x1-meter unit (Unit 11), exposing more of the pit, and Berger followed with a 5x20-meter backhoe block, Block 14. In Block 14, four apparent cultural pit features were found, Features 3, 4, 5, and 6 (see Figure 14). These features were more than 1 meter in diameter and 80 to 130 centimeters deep, with steep sides and flat bottoms. They contained very few artifacts (see discussion above in Section B.1).

Because of the discovery of an apparent cluster of prehistoric storage pits, the Silo Pit area was selected for further investigation during the Phase III excavations. A three-stage plan for data recovery in the Silo Pit area consisted of (1) systematic sampling the plowzone deposits with 1x1-meter units, (2) mechanical stripping of the plowzone, and (3) excavating features. A large number of anomalies were exposed by the stripping, and 56 feature numbers were assigned in this area (Figure 22). Most of these features were judged to be natural disturbances of one kind or another, such as rodent burrows, tree throws, or variations within the highly complex natural subsoils. However, at least 14 of the features were cultural pits, and seven more were of uncertain origin. All of the features believed to be cultural were completely excavated, along with a sample of the features thought to be natural. In all, 23 features were completely excavated, and eight were partially excavated. The cultural features included one cluster of storage pits, designated the Main Pit Cluster (Figure 23), as well as scattered storage pits and one hearth. Although this area contained many features, relatively few artifacts were recovered (Table 5).

a. Summary of the Phase III Plowzone Sampling Results

As very few artifacts were recovered during the previous Phase I and Phase II investigations in this area, it was expected that little information would be lost by mechanical stripping, and only a 1 percent sample of the plowzone was excavated. Units measuring 1x1-meter were laid out at 10-meter intervals, providing a 1 percent sample. To allow some expansion in the area to be stripped,

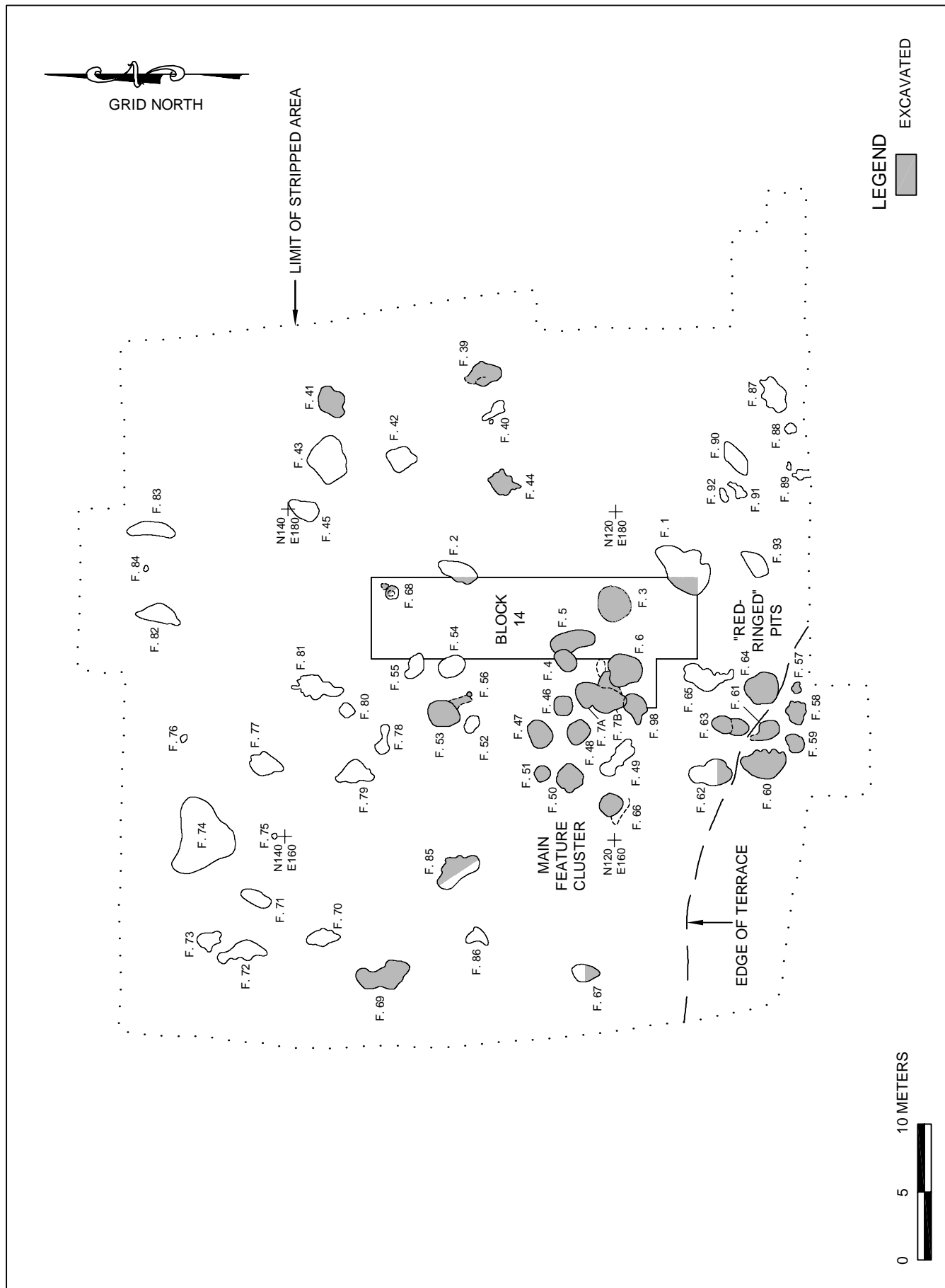


FIGURE 22: Distribution of Features, Mechanically Stripped Area in Locus 1

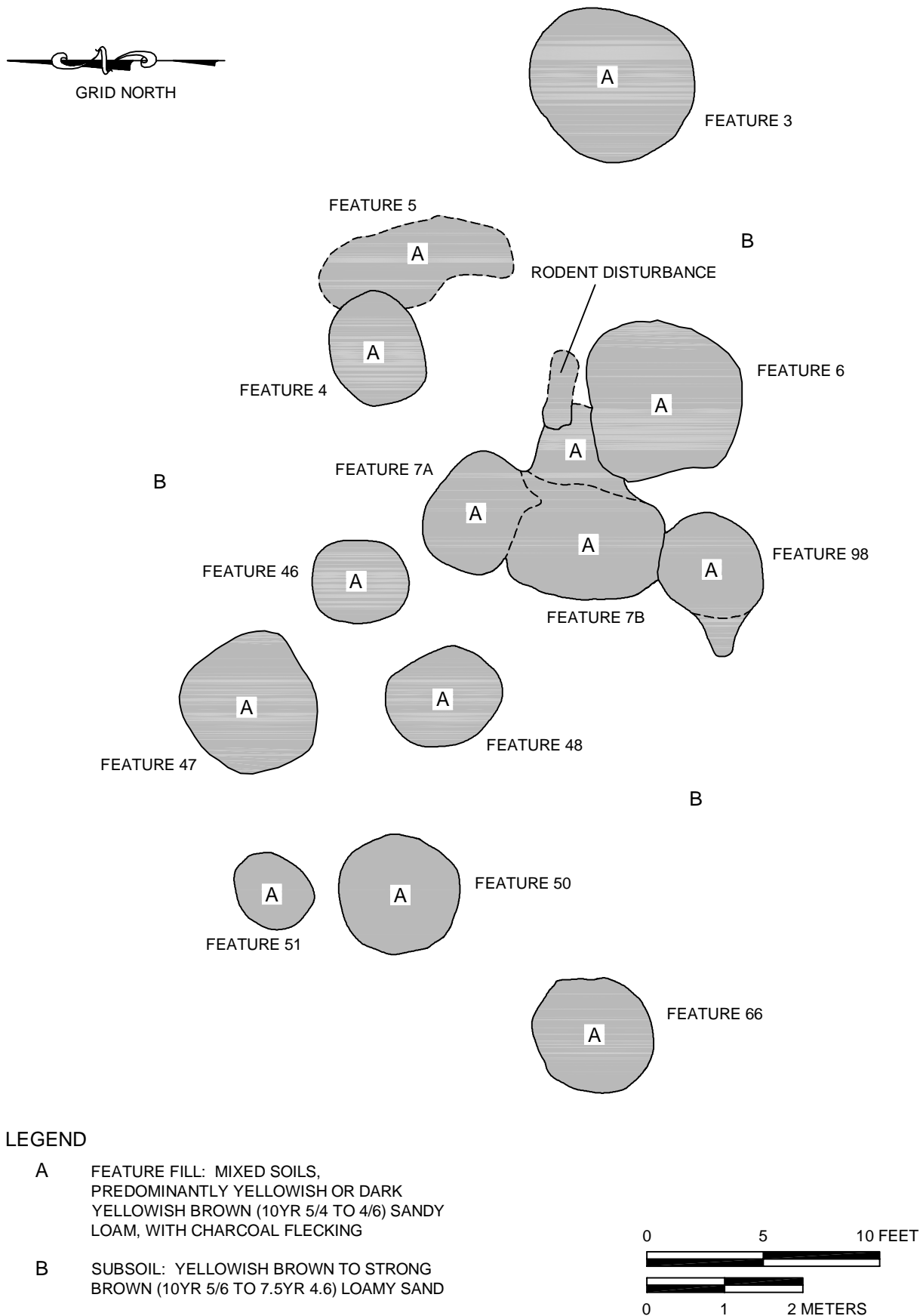


FIGURE 23: Plan of Features in the Main Pit Cluster, Silo Pit Area

TABLE 5: SUMMARY OF PREHISTORIC ASSEMBLAGE, SILO PIT AREA

ARTIFACT TYPE	RAW MATERIAL							TOTAL
	Jasper	Chert	Quartz	Quartzite	Sandstone	Rhyolite	Other	
Bifaces								
Projectile Points	3	2	.	.	.	1	.	6
Late-Stage Bifaces	.	1	.	.	.	.	.	1
Biface Fragment	.	1	.	.	.	.	.	1
Cores								
Freehand Cores	1	.	.	2	.	.	.	3
Tested Cobbles	2	2	2	3	.	.	.	9
Hammerstone	.	.	.	.	2	.	.	2
Metate				1				1
Debitage								
<6 mm	1	.	.	.	.	.	.	1
6-10 mm	18	10	6	.	.	1	.	35
11-15 mm	46	48	14	4	.	.	.	112
16-20 mm	36	21	12	5	.	.	.	74
21-30 mm	18	36	24	4	.	.	.	82
31-40 mm	11	8	7	4	.	.	.	30
41-50 mm	2	6	3	3	.	.	.	14
51-60 mm	1	1	1	.	.	.	.	3
>60 mm	.	1	1	.	.	.	.	2
Fire-Cracked Rock	19	20	45	52	121	.	36	293
Ceramic	.	.	.	.	.	.	.	123
TOTAL	158	157	115	78	123	2	36	792

Note: Artifacts recovered from individual features are presented in Appendix K, Volume II.

Source: *Berger Phase I, Phase II, and Phase III data.*

the units actually extended over an area of 50x50 meters. A total of 36 units were excavated in addition to the five units excavated during the Phase II testing. In general, the sampling of the plowzone units confirmed the low artifact densities observed in the Phase I and Phase II work. A total of 32 prehistoric artifacts were recovered, fewer than one per test unit. The highest count within the project corridor was three artifacts. The base of a Fox Creek lanceolate point (AD 400 to 900) was the only diagnostic artifact found in the plowzone.

Although artifact densities were generally very low, there was a noticeable increase over the concentration of exposed features. While most of the units yielded less than three artifacts, a group of five units in the southern half of Block 14 and just to the west yielded an average of five, including 10 from HRI's Unit 11. This "concentration" measured about 10x10 meters. The only other unit with more than three artifacts was a Phase II unit in the northeast corner of Block 14, 10 meters away, which yielded eight flakes.

In general, the plowzone consisted of sandy loam approximately 20 centimeters deep. The Silo Pit area sloped gently, and the stratigraphy showed evidence of erosion and deflation. The E-horizon

was present in only a few isolated patches; in other areas the B-horizon was directly beneath the plowzone. One notable variation from the typical stratigraphy was identified. In Unit 303, at the extreme southwest corner of the testing area, a buried plowzone similar to the one in the Buried Plowzone area around Block 16 was found. This area was nearly flat, and soil washing down the slope to the north collected here, thickening the plowzone until part of it was no longer reached by the plow.

b. Results of the Phase III Plowzone Stripping

The initial plan called for the plowzone to be mechanically removed from an estimated area measuring 40x40 meters, centered around Phase II Block 14, although the plowzone sampling actually covered a somewhat larger area, in anticipation that mechanical stripping might be required over a larger area. Because Block 14 was close to the southern edge of the project right-of-way, and because the area south of Block 14 sloped more steeply down to Puncheon Run, the 40x40-meter block was laid out so that it extended only 5 meters south of Block 14 but 15 meters to the north. (Block 14 measured 20 meters north-south and 5 meters east-west.) The original strategy was to begin with a 40x40-meter block, and to expand the area as necessary to extend at least 5 meters beyond any apparent cultural feature. Features were found near the southern and eastern edges of the block (see Figure 22). Along the southern edge, southwest of Block 14, a cluster of pits with distinctive, red, oxidized rings around their edges was found, so the edge of the excavation was extended 3 meters to the south along a strip 10 meters long. Along the eastern edge, Feature 39, a round stain resembling the “silo” pits identified during the extended Phase II investigations, was found, so the mechanical stripping continued to the east to search for possible associated features.

After mechanical stripping, the exposed subsoil was carefully trowelled, and a total of 44 anomalies were identified and mapped. A majority of these anomalies appeared to be attributable to various natural phenomena, including rodent burrows, drainage gullies, and older variations within the subsoil.

Interpretation of all the features (Table 6) was complicated by the high variability within the Pleistocene soils on the site. Much of the variability in the subsoil was attributed to an ancient network of braided streams, which left a complex pattern of sand, gravel, and silt deposits. As a result, large variations within the subsoil from one side of a pit feature to the other were not unusual. Within this background, cultural pit features stood out because of their shapes and their apparent young age, based on organic content and lack of development of their fill soils. However, some soil anomalies had the appearance of cultural pits but were ultimately identified as ancient natural disturbances. Thus, the interpretation of some features remains uncertain. The variability and complexity of the site soils was also reflected in the soil chemical analysis, and major differences could be observed between adjacent strata and levels.

c. Feature Excavation Methods

The features were all excavated with a similar technique. First, the feature was sectioned, and then one-half was excavated to subsoil in arbitrary 10-centimeter levels. All soil was

TABLE 6: EXCAVATED FEATURES IN THE SILO PIT AREA

Feature	Description	Amount Excavated (%)
1	Natural disturbance	50
2	Natural disturbance	50
3	Silo pit in the Main Pit Cluster	100
4	Silo pit in the Main Pit Cluster	100
5	Natural disturbance, overlapped with Fea. 4	100
6	Silo pit in the Main Pit Cluster	100
7A	Silo pit in the Main Pit Cluster	100
7B	Silo pit in the Main Pit Cluster	100
39	Probable natural disturbance, but resembled silo pits	100
41	Possible isolated silo pit	100
44	Shallow basin with FCR	100
46	Silo pit in the Main Pit Cluster	100
47	Silo pit in the Main Pit Cluster	100
48	Silo pit in the Main Pit Cluster	100
50	Silo pit in the Main Pit Cluster	100
51	Deep basin in the Main Pit Cluster	100
53	Irregular pit, probably natural	100
57	Probable animal burrow in the “red-ringed pit” area	100
58	Shallow basin; “red-ringed pit”	100
59	Shallow basin; “red-ringed pit”	100
60	Tree throw containing prehistoric artifacts	50
61	Shallow basin; “red-ringed pit”	100
62	Oval pit, probably natural	30
64	Deep basin; “red-ringed pit”	100
66	Silo pit in the Main Pit Cluster	100
67	Oval pit, probably natural	50
68	Rodent burrow, possibly including some remnant of a prehistoric pit	50
69	Prehistoric pit heavily disturbed by rodent tunneling	100
80	Shallow, natural disturbance	30
85	Oval pit, probably natural	50
98	Silo pit in the Main Pit Cluster	100

Note: Detailed descriptions of individual features are presented in Appendix K, Volume II.

screened through 6-millimeter (¼-inch) mesh, and any charcoal noted was retained. A rectangular block of subsoil around the excavated half of the feature was then removed to provide a contrast between the feature fill and the surrounding subsoil (Plates 16 and 17). Because the Phase II testing consistently showed that no artifacts were present in the natural subsoil, soil outside the features was not screened. In at least three cases, excavation of the block showed that the pit outline followed during the initial feature excavation was not actually the edge of the feature, so the subsoil removal was valuable in understanding the true form of the feature. If the feature appeared to be cultural, based on its overall form and the stratigraphy of the fill, a third quadrant was then excavated to expose the transverse profile. Excavation of the third quadrant proceeded stratigraphically, with 10-centimeter levels within strata. Samples for flotation (2 liters), soil chemistry (0.5 liter), and phytolith analysis (0.05 liter) were taken from the third quadrant of each feature. (If the third quadrant was not excavated, samples were taken from the exposed section). If the feature was not clearly stratified, samples were taken from the second level and the bottom level; if clear strata were identified, samples were taken from each strata. The final quadrant was then excavated by strata and levels.

d. The Main Pit Cluster

Most of the apparently cultural features in the stripped area were inside an area measuring 12x5 meters, within and just west of Phase II Block 14. Features 3, 4, 6, 7A, 7B, 46, 47, 48, 50, 51, 66, and 98 were all in this area (see Figure 23), as was



PLATE 16: Feature 4, Block 14, Locus 1



PLATE 17: Feature 48, Main Pit Cluster, Locus 1; crew member Paul Stansfield preparing feature profile for measured drawing (see Figure 25)

the feature identified in HRI's Unit 11. All of these features appeared to be cultural, and the spatial clustering of these 12 pits suggests that they were created and used within a relatively short time span, possibly a single season, leaving the surrounding area clear throughout the period of their use.

On the other hand, some of the pits overlapped, especially 7A, 7B, and 98, so they cannot have been used simultaneously. This feature cluster corresponded to the area of increased artifact density in the plowzone, as noted above.

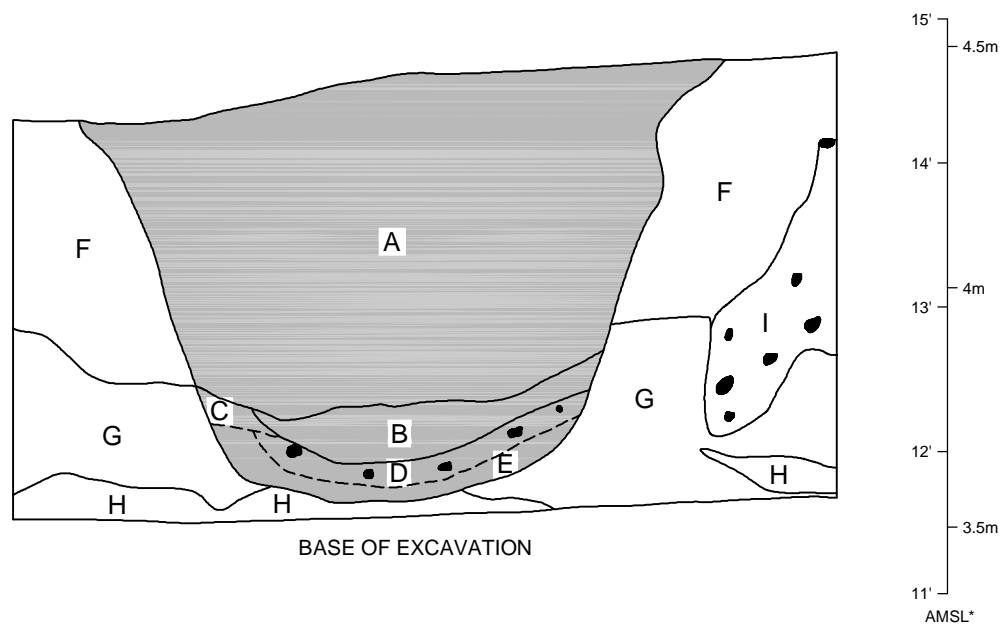
The pits varied in shape and size. All were roughly round in plan view, but they varied in diameter from 220 centimeters (Feature 3) to 85 centimeters (Feature 51). Features 3, 4, 6, 7A, 7B, 46, 47, 48, 50, 66, and 98 were cylindrical, with flat bottoms and nearly straight sides. Depths varied from 54 centimeters (Feature 66) to 112 centimeters (Feature 98). Feature 51 was shallower, and its shape could be described as a deep basin rather than a silo.

The stratigraphy of the pits generally followed a common pattern, with some minor exceptions. Features 7A, 7B, 46 (Figure 24), 47, and 98 all closely resembled Feature 3, excavated during Phase II (see Section B.1 above), with a massive, topmost fill occupying at least half of the pit and a series of small lenses of other soils underneath it. Feature 48 had distinctively different inner and outer fills (Figure 25); the inner fill may represent a reuse of the feature after it had been only partially dug out. Feature 66 was shallower than the other pits, and it showed evidence of slumping around the edges. Detailed descriptions of all of the features in this group are provided in Volume II, Appendix K.

Relatively few artifacts, approximately 260, were recovered from the features in the Main Pit Cluster. These consisted mostly of debitage and small pieces of fire-cracked rock, although three small fragments of prehistoric pottery were also found. Nearly half (49%) of the debitage had remnant cortex, showing that it probably came from local cobbles. The artifacts were concentrated in the upper levels of the features, with about 60 percent found in the top three levels and 80 percent in the top five levels. These upper layers would have been deposited into the features after they were abandoned, bringing the artifacts with them. Soils in the bottoms of the features, which may have been part of the original feature fills, were almost entirely sterile. On the other hand, the correspondence of the feature cluster with the area of increased artifact density may indicate that at least some of these artifacts derive from the people who used the features, and that analysis of these artifacts may, therefore, tell us something about activity around the storage pits.

The main inferences that can be drawn from the use of these pit features from the artifacts are negative. No projectile points, knives, or other bifaces were found, nor even any unifaces or utilized flakes. Activities at the storage pits do not seem to have involved much use of edged stone tools. Flakes were found in and around the pits, but in such small numbers that they could easily derive from ancillary activities. Perhaps the tools being used or sharpened were used in occasional or exceptional tasks, such as cutting digging sticks or making drying racks, or even sharpening tools meant to be used somewhere else on some other activity. A number of cobbles were found in the pits, two of which appeared to have been used as hammerstones and one as a metate or grinding stone. Several large cobbles were also found, but they were not visibly modified. There were no cobbles in the natural topsoil of the site, and it is possible that these cobbles had been brought to the site and used in ways that did not damage the stone.

The only diagnostic artifacts recovered from the Main Pit Cluster were two small potsherds. A sherd of clay-tempered Coulbourn ware, circa 600 BC to AD 200, was found in Feature 50. A sherd from



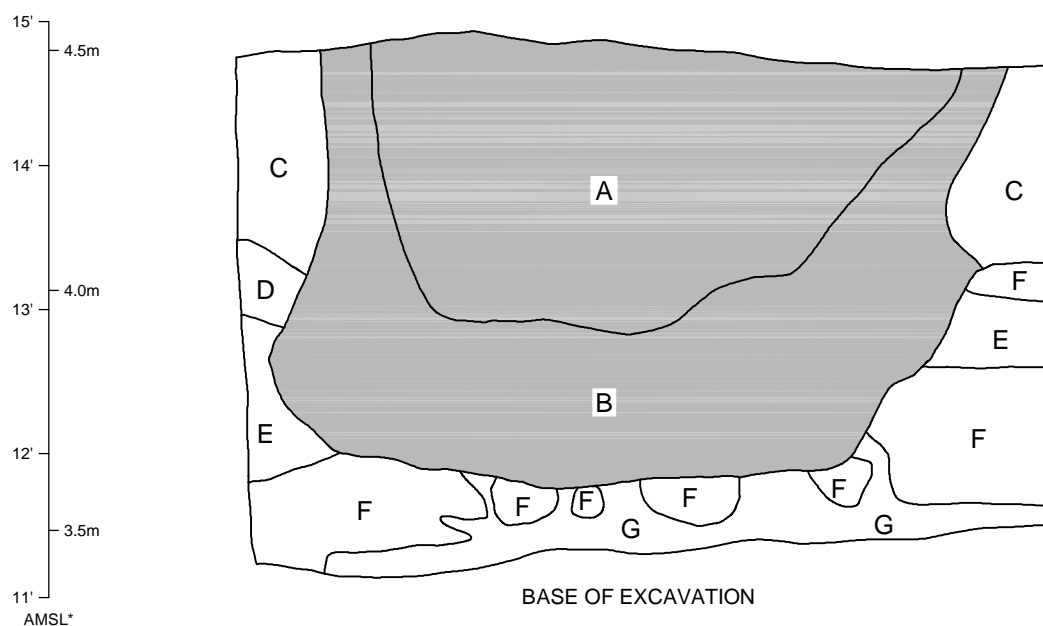
LEGEND

- A FEATURE STRATUM A: YELLOWISH BROWN (10YR 5/6) SANDY LOAM MIXED WITH SOME DARK YELLOWISH BROWN (10YR 4/6) SANDY LOAM; CHARCOAL FLECKING
- B FEATURE STRATUM B: YELLOWISH BROWN (10YR 5/6) SANDY LOAM MIXED WITH SOME BROWNISH YELLOW (10YR 6/8) LOAMY SAND
- C INCLUSION IN FEATURE: BROWNISH YELLOW (10YR 6/6) LOAMY SAND
- D FEATURE STRATUM C: YELLOWISH BROWN (10YR 5/6) SANDY LOAM WITH HEAVY CHARCOAL FLECKING AND 12-15 % GRAVEL
- E FEATURE STRATUM D: YELLOWISH BROWN (10YR 5/6) SANDY LOAM WITH 12- 15% GRAVEL
- F B-HORIZON: YELLOWISH BROWN (10YR 5/8) SANDY LOAM
- G B-HORIZON: VERY PALE BROWN (10YR 7/4) SILT LOAM
- H C-HORIZON: BROWNISH YELLOW (10YR 6/8) COARSE SAND
- I SUBSOIL: YELLOWISH BROWN (10YR 5/8) SAND WITH INCLUSIONS OF VERY PALE BROWN (10YR 7/4) SILT LOAM AND 30 % GRAVEL
- ROCK



*ABOVE MEAN SEA LEVEL

FIGURE 24: Stratigraphic Profile, Feature 46



LEGEND

- A FEATURE STRATUM A: YELLOWISH BROWN (10YR 5/6) SANDY LOAM MIXED WITH SOME DARK YELLOWISH BROWN (10YR 4/6) SANDY LOAM; CHARCOAL FLECKING
- B FEATURE STRATUM B: YELLOWISH BROWN (10YR 5/6) SANDY LOAM MIXED WITH SOME BROWNISH YELLOW (10YR 6/6) SANDY LOAM
- C SUBSOIL: YELLOWISH BROWN (10YR 5/8) SANDY LOAM.
- D SUBSOIL: BROWNISH YELLOW (10YR 6/8) LOAMY SAND
- E SUBSOIL: YELLOWISH BROWN (10YR 5/8) LOAMY SAND
- F SUBSOIL: LIGHT BROWNISH GRAY (2.5YR 6/2) SILT LOAM
- G SUBSOIL: BROWNISH YELLOW (10YR 6/8) COARSE SAND



*ABOVE MEAN SEA LEVEL

FIGURE 25: Stratigraphic Profile, Feature 48

Feature 66 was identified as a quartz-tempered variety intermediate between Wolfe Neck (circa 700 to 400 BC) and Hell Island (circa AD 600 to 1000). Feature 66 is also notable for the inclusion of a possible seed coat fragment from American lotus, which was recovered by flotation (see Volume II, Appendix C).

Charcoal samples were recovered from all of the features in the Main Pit Cluster, although the pit fills as a whole contained very little organic material. Three pits, Features 50, 51, and 66, had lenses of charcoal and burned earth within their fills. Charcoal was also very present in the bottom of Feature 46 and throughout the fill of Features 7A and 7B. The presence of charcoal in so many feature fill contexts suggests that the people using the pits were building fires, perhaps to dry the food being stored, or that the environment was being manipulated by controlled burning. Several pieces of burned clay were also found in the features. Table 7 provides a summary of the of radiocarbon dates for the Silo Pit area.

The majority of the dates from the silo features (3, 6, 7A, 7B, 46, 50, 66, and 98) are fairly well clustered, suggesting that they represent a single extended “episode” of use somewhere around AD 1 to 400. However, certain of the dates are much earlier or later, creating interpretive difficulties. One of the dates from Feature 7B is 1,200 years earlier than the other, and the feature can hardly have been in use for so long. Feature 98, which is adjacent to Feature 7B, also produced a relatively early date. The two dates from Feature 51 are 500 years older than the main series of dates, but 500

TABLE 7: RADIOCARBON DATES FROM LOCUS 1, MAIN PIT CLUSTER

Context	Lab Number	Analysis	Radiocarbon Age	Calibrated Date		
Feature 3, A-2	Beta-114670	Extended count	1,820±80 BP	AD 45	to	410
Feature 3, A-6	Beta-114671	Standard	1,870±100 BP	50 BC	to	AD 405
Feature 3, B-10	Beta-114672	Extended count	1,820±80 BP	AD 45	to	410
Feature 6, C-6	Beta-114673	Standard	1,980±60 BP	75 BC	to	AD 160
Feature 7A, A-5	Beta-131157	AMS	1,850±70 BP	AD 20	to	350
Feature 7A, A-8	Beta-131160	Standard	1,700±80 BP	AD 135	to	540
Feature 7B, A-3	Beta-136100	AMS	1,950±30 BP	AD 45	to	140
Feature 7B, A-6	Beta-136101	AMS	3,330±40 BP	1685	to	1505 BC
Feature 41, C-7	Beta-131156	AMS	2,460±50 BP	785	to	400 BC
Feature 46, A-2	Beta-131151	AMS	1,930±40 BP	5 BC	to	AD 140
Feature 46, C-1	Beta-131158	Standard	1,850±70 BP	AD 20	to	350
Feature 50, A-2	Beta-136093	AMS	1,780±40 BP	AD 225	to	405
Feature 50, A-3	Beta-136094	AMS	1,670±40 BP	AD 260	to	440
Feature 51, A-2	Beta-131154	AMS	2,530±50 BP	805	to	425 BC
Feature 51, A-3	Beta-131159	AMS	2,440±50 BP	780	to	395 BC
Feature 64, A-2	Beta-131152	AMS	3,600±50 BP	2120	to	1780 BC
Feature 64, A-3	Beta-131153	AMS	2,830±50 BP	1120	to	845 BC
Feature 66, A-2	Beta-131148	Standard	1,850±60 BP	AD 45	to	330
Feature 66, A-4	Beta-131149	AMS	1,730±90 BP	AD 225	to	415
Feature 69, B	Beta-136103	Extended Count	1,030±100 BP	AD 780	to	1220
Feature 98, A-6	Beta-136102	AMS	2,970±50 BP	1375	to	1020 BC

years later than those from Features 7B and 98. Feature 51 is actually different in shape from the silos; it is much smaller and has a basin shape. Thus, if Feature 51 represents an earlier episode, then the remaining features appear to be more consistent with each other. The Coulbourn ceramic sherd (500 to 100 BC) recovered from Feature 51 also supports the accuracy of the earlier date. The anomalous dates in Features 7B and 98 are less convincing, especially since Feature 7B also produced a date within the main sequence, and it seems more likely that they actually date to the later period; older charcoal was probably incorporated into the feature fills, just like the two older potsherds. The very small amounts of charcoal available for testing required that Accelerator Mass Spectrometry (AMS) dating be used in many cases, and this may account for some of the anomalous radiocarbon dates. Such small amounts of charcoal could easily have derived from forest fires or cooking/heating fires lit hundreds of years before the soil washed into the features. For this reason, the later dates are more important.

A summary of some of the soil chemistry for the silo pits is given in Table 8, and two nearby control columns are shown in Table 9. Analysis of this data revealed some anomalies that may be cultural in origin. However, the variation in the chemistry of the silo pits is not really significantly greater than the variation within the natural soils of the site, and ascription of these anomalies to cultural causes can only be tentative. A spike in the concentration of phosphorus was detected in Stratum B of Feature 51, and somewhat elevated levels were also noted in Features 50 and 66. Phosphorus is found in organic matter, and it is often considered a sign of cultural activity. It is also found in agricultural fertilizers, which accounts for the high concentrations found in the topmost subsoil levels. The origin of the high levels found in some deeper subsoil levels, such as the 4C-horizon near Feature 64, is less clear. Calcium, which may derive from bone or shell, was also more concentrated in some feature contexts, including Features 7A, 50, 51, and 66. This calcium may derive from the disposal of trash containing bones or shells. (A summary of all soil chemistry test results for the entire site is provided in Volume II, Appendix A, Attachment C.)

e. Features 57, 58, 59, 61 and 64: The Red-Ringed Pits

At the southern edge of the stripped area was a small cluster of distinctive pits. The subsoil in this area was very loose sand. The fill in these features was much more compact, with a higher silt content, and after the plowzone had been stripped the features actually stood up above the surrounding subsoil. In plan view, each feature was round and surrounded by a distinct reddish ring of soil. The features varied greatly in size, from 180 centimeters in diameter (Feature 64) to 50 centimeters (Feature 57), and excavation showed that they differed in shape and structure as well. Feature 57 was irregular and appeared to be an old burrow. Features 58 (Figure 26), 59, and 61 were shallow basins of rather regular form, all roughly 30 centimeters deep. Feature 64 reached a maximum depth of 72 centimeters below the plowzone. Very few artifacts were recovered from these features, although a broken chert projectile point with a finely serrated blade was recovered from the bottom of Feature 64. The complete base of this point was not present, but it resembled the Kirk corner-notched type.

The nature of the red-ringed pits features is uncertain, but they do not resemble what were identified as tree-related disturbances in the same part of the site (Features 60 and 62). They may be a distinct

TABLE 8: SOIL CHEMISTRY OF THE SILO PITS

Feature	Stratum	Level	pH	Total Phosphorus	Organic Matter	Calcium	Strontium
3	A	3	6.0	112.4	0.27	166.3	4.34
3	A	5	5.9	85.3	0.21	148.4	4.28
3	A	7	6.1	102.9	0.13	143.1	5.53
3	B	9	6.2	120.6	0.14	216.7	5.27
3	C	10	6.3	121.8	0.10	265.3	5.05
3	D	11	6.2	126.4	0.14	233.6	5.40
4	B	3	5.9	137.4	0.29	238.8	5.20
4	B	5	6.0	115.5	0.28	193.4	4.49
4	B	7	6.0	107.3	0.20	206.8	4.34
4	B/C	9	6.1	82.3	0.17	174.3	4.45
4	C	11	6.2	70.6	0.18	174.2	4.07
5	A	3	6.0	185.9	0.24	176.2	5.87
5	A	5	6.1	146.7	0.23	153.1	5.11
5	A	6	6.0	115.1	0.17	181.4	4.64
6	B	2	6.1	102.1	0.59	160.9	4.10
6	B	3	6.2	77.3	0.16	126.6	3.23
6	B	5	6.3	105.4	0.17	192.9	5.31
7A	A	2	5.4	218.0	0.56	261.9	7.9
7A	A	7	5.6	158.1	0.37	242.7	9.0
7A	B	6	5.5	128.6	0.33	187.4	7.5
48	A	2	5.4	171.3	0.45	162.1	7.0
48	A	7	5.9	123.9	0.27	201.4	7.9
48	B	9	6.0	117.4	0.29	185.3	7.2
50	A	2	5.8	244.7	0.92	338.3	9.2
50	B	5	5.9	200.7	1.28	225.2	8.3
51	A	1	5.8	195.2	0.00	228.7	8.7
51	A	4	6.0	148.4	0.73	398.1	5.7
51	B	3	5.9	306.7	0.02	345.7	8.1
66	A	2	5.5	151.2	0.18	202.3	6.4
66	B	2	5.6	202.2	0.26	300.3	8.6
98	A	2	5.6	149.7	0.18	157.8	6.0
98	B	8	6.0	130.8	0.18	198.2	7.0
98	D	10	6.0	118.2	0.46	163.8	9.3

Note: Chemical values in parts per million; organic matter by Walkley-Black method.

TABLE 9: SOIL CHEMISTRY FROM CONTROL COLUMNS NEAR THE SILO PITS

Context	Soil Horizon	pH	Organic Matter	Total Phosphorus	Calcium	Strontium
Adjacent to Feature 53						
	Bt1	5.8	0.24	117.3	312.4	12.1
	Bt2	5.4	0.24	128.9	268.3	11.2
	BC1	5.4	0.24	132.6	220.4	8.9
	BC2	5.2	0.28	114.8	205.7	9.2
	2BC	5.4	0.26	81.0	167.4	8.5
	3C	5.4	0.18	70.2	130.1	6.4
Adjacent to Feature 64						
	Bt	5.6	0.14	247.0	308.8	10.9
	2BC	5.3	0.07	165.6	132.4	5.9
	2C	5.6	0.22	108.2	78.7	5.7
	3C	5.7	0.12	89.6	73.4	4.2
	4BCb	5.4	0.20	148.3	94.6	5.3
	4C	5.4	0.18	223.1	100.8	5.2

Note: Chemical values in parts per million; organic matter by Walkley-Black method.

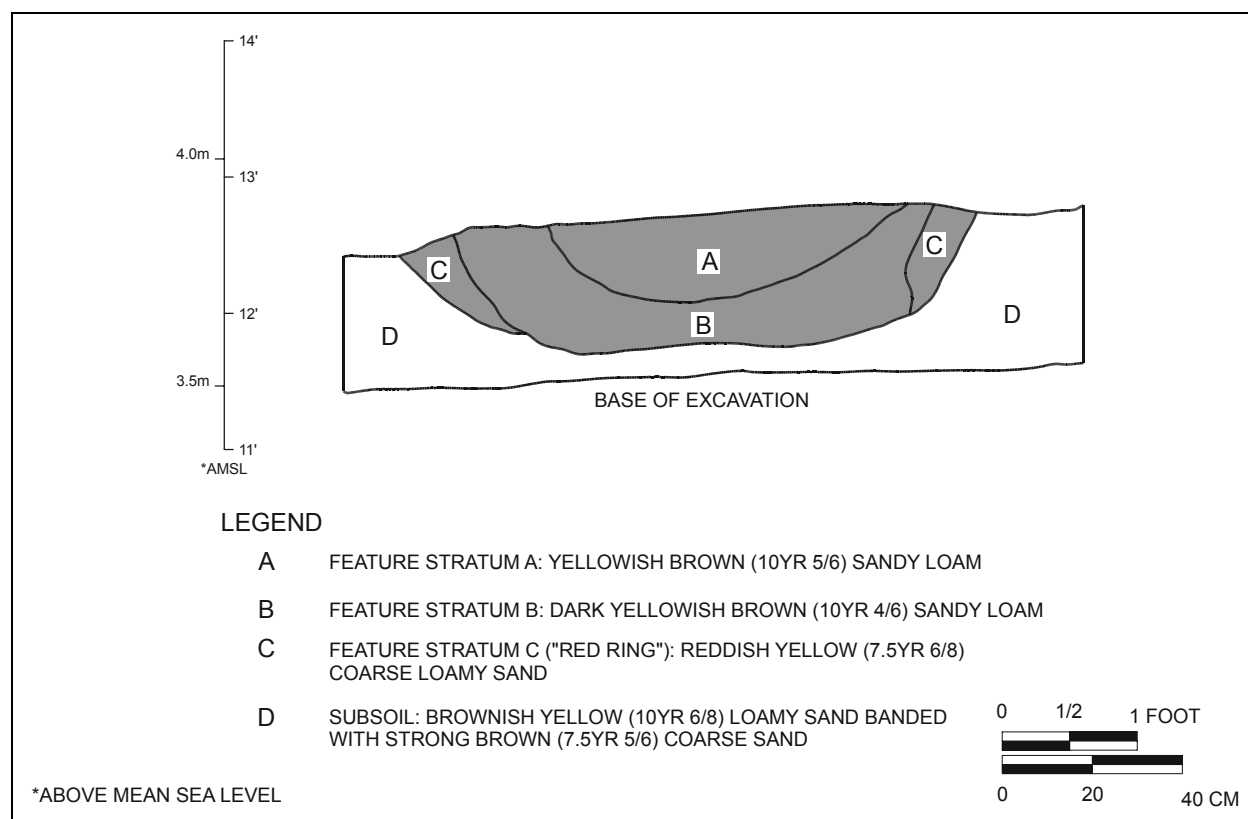


FIGURE 26: Stratigraphic Profile, Feature 58

type of cultural pit that differs from those of the Main Pit Cluster. Radiocarbon dates from Feature 64 date it to the second millennium BC, well before use of the Main Pit Cluster or Features 51 and 41 (see Table 7). The distinctive reddish rings may have been created by natural chemical processes which are related to the drainage characteristics of the soil. The soil within the pits was of a finer texture (predominantly silt) than the surrounding subsoil, creating increased water flows along the feature boundary; this area also dried out faster because it was in contact with the surrounding sand. The combination of increased water flow and rapid drying led to increased oxidation, which creates the red color. Analysis of one of the red-ringed pits (Feature 64) did not show any unusual chemical concentrations (Appendix A, Volume II).

f. Feature 41: Possible Prehistoric Storage Pit or Tree Disturbance

One feature resembling those in the Main Pit Cluster was found some distance away, near the northeast corner of the stripped area. Feature 41 appeared to be a round silo pit, with a maximum depth of 92 centimeters below the plowzone. The stratigraphy of the pit was quite complex, with numerous subsoil intrusions that could have been related to the slumping of subsoil along the sides of the pit. Observers debated whether the feature was a natural disturbance or a silo pit that had experienced several episodes of slumping along the sides. A date of 2,460±50 radiocarbon years BP (Beta-131156) was obtained from the feature; this date is earlier than the Main Pit Cluster but comparable to Feature 51.

The main pit fill of Feature 41 was quite different from the pit fills in the Main Pit Cluster, and although the Feature 41 fill was very sandy, chemical analysis (Table 10) showed that it had a higher level of organic matter than most of the other pit fills. The soil chemistry also showed a marked increase in the levels of calcium and strontium in the middle layers of the feature, along with a more modest increase in the level of phosphorus. Calcium and strontium could derive from animal bone or shell, whereas phosphorus could come from any sort of organic matter. This suggests that after

TABLE 10: SOIL CHEMISTRY OF FEATURE 41

Feature	Stratum	Level	pH	Organic Matter	Total Phosphorus	Calcium	Strontium
41	A	4	5.8	0.61	127.8	229.3	6.0
41	B	6	6.0	0.76	94.0	234.6	7.2
41	B	8	6.1	0.84	211.5	363.6	11.5
41	B	9	6.1	0.69	109.2	196.5	6.3
41	E	10	6.3	0.84	122.0	154.8	3.1
Control Column							
	BT	0-25 cm	5.8	0.23	224.2	357.2	9.1
	BC	25-40 cm	5.8	0.02	182.7	246.7	6.2
	CB	40-59 cm	5.9	0.10	159.2	110.2	4.5
	C	59-72 cm	6.0	0.03	107.8	79.6	3.7
	2C	72-90 cm	5.8	0.41	100.5	152.8	4.2

Note: Chemical values in parts per million; organic matter by Walkley-Black method.

this feature was used as a storage pit trash may have been dumped into the open hole. However, the levels are not all that much higher than some of those found in the control columns, so it is possible that they derive from natural sources.

g. Features 60 and 69

The only two features in the Silo Pit area that contained significant concentrations of artifacts were two apparent natural disturbances, Features 60 and 69. Feature 60 was located near the red-ringed pits at the southern edge of the excavation, adjacent to two other, similar features, Features 62 and 63. In plan view Feature 60 was roughly crescent shaped, but it contained many different fills, some of them obviously displaced subsoil. In profile the feature was asymmetrical. All observers agreed that the feature resembled a tree throw. However, a small trench excavated across the feature yielded a broken anvil or nutting stone and 22 flakes. A large sample of the remaining feature fill was later excavated, and this material contained a bifurcate-based projectile point fragment, a narrow-bladed, stemmed point resembling those found in large numbers at Locus 3, a chert late-stage biface, a chert biface fragment, a jasper freehand core, 11 pieces of fire-cracked rock, and more than 50 pieces of debitage. The bifurcate-based point dates to the Archaic period (ca. 7000 to 5500 BC) and the stemmed point probably dates to the Woodland I period (Dent 1995:161); thus, the artifacts represent a mix of time periods. The debitage, primarily chert, jasper, and quartz, was essentially identical to that found in the plowzone and other nearby features.

Feature 69 was located near the western edge of the excavation. It appeared to be roughly semicircular in plan view, but it had been disturbed by so many rodent tunnels that its outline was obscured. Much of what was excavated as the feature fill also appeared to be rodent disturbance. The remainder of the feature consisted of several different fills, some very similar to the surrounding subsoils, without a clear boundary along the east side. In plan view the feature resembled a tree disturbance, but it was up to 100 centimeters deep and for the most part no more than 125 centimeters wide—quite deep and narrow for a tree throw. Full excavation of the feature yielded an assemblage of more than 200 prehistoric artifacts (Table 11), more than 100 of which were sherds of steatite-tempered pottery, including Selden Island and Marcey Creek wares (Plate 18). Each group of sherds appears to represent a single vessel, although few sherds could be joined. The most likely interpretation is that there was some sort of prehistoric pit in this location, but that pit was severely disturbed, obliterating its original outline. Groundhogs were certainly responsible for much of that disturbance, and a tree fall may also have contributed to the form of the feature. While excavation of Feature 69 was in progress, runoff from a rain shower produced severe erosion at the edge of the feature, thereby providing an important lesson in the variety of natural processes which can contribute to feature formation (Plate 19).

Selden Island and Marcey Creek pottery date to around 1200 to 800 BC, 900 years earlier than the radiocarbon dates obtained from the Main Pit Cluster and 2,000 years earlier than the date obtained for a sample from Feature 69 itself. However, a date within the generally accepted date range for Selden Island pottery was obtained from Feature 41, in the northeast corner of the block, 30 meters away from Feature 69. The debitage from Feature 69 was somewhat different from that found in the surrounding area; it was slightly smaller on average, with less cortex (37% versus 48%), and with

TABLE 11: SUMMARY OF PREHISTORIC ASSEMBLAGE, FEATURE 69

ARTIFACT TYPE	RAW MATERIAL						TOTAL
	Jasper	Chert	Quartz	Quartzite	Sandstone	Siltstone	
Debitage							
<6 mm	1	.	.	.	.	.	1
6-10 mm	8	.	3	.	.	.	11
11-15 mm	13	3	5	.	.	.	21
16-20 mm	4	1	3	2	.	.	10
21-30	4	.	6	1	.	.	11
31-40 mm	.	.	2	1	.	.	3
Fire-Cracked Rock	5	5	3	5	20	14	52
Selden Island	.	.	.	.	.	.	21
Marcey Creek	.	.	.	.	.	.	47
Unidentified Ceramic	.	.	.	.	.	.	35
TOTAL	35	9	22	9	20	14	212

Source: Berger Phase III data.

a much lower percentage of chert (7% versus 43%). The artifacts from Feature 69 indicate an occupation of the site during the period 1200 to 800 BC that included the use of ceramics and the excavation of pits.

h. Features 39, 53, 67, 68, 80, and 85: Natural Features

Excavation in the Silo Pit area was focused on those features that appeared most clearly to be cultural based on their formal characteristics. However, a few suspected natural features were also tested, in order to sample the full range of variability. The features considered natural were distinguished from those identified as cultural primarily based on their shapes, which were highly irregular. Of course, over a period of many centuries, a cultural feature might have been reshaped by a natural event such as a tree throw or rodent burrow.

Feature 39 was a soil anomaly 15 meters east of the Main Pit Cluster. It appeared on the surface as an oval stain, similar in color and texture to the cultural pits in the Main Pit Cluster. It was investigated as a possible silo pit and completely excavated. The boundaries were hard to determine, because the surrounding subsoil was slightly more brown (10YR 5/6 versus 7.5YR 5/8) and siltier than was usual in the area, closely resembling the feature fill. Inspection of the profile (Figure 27) showed that this brown subsoil was filling a large pit or ditch, and that Feature 39 was located in the center of this pit. Feature 39 contained artifacts, including a small potsherd and a possible hammerstone, but its shape appeared quite irregular. Although the surrounding natural anomaly was a complicating factor, the most likely interpretation is that Feature 39 was some kind of natural disturbance, but this feature, like some others, defied a simple explanation.

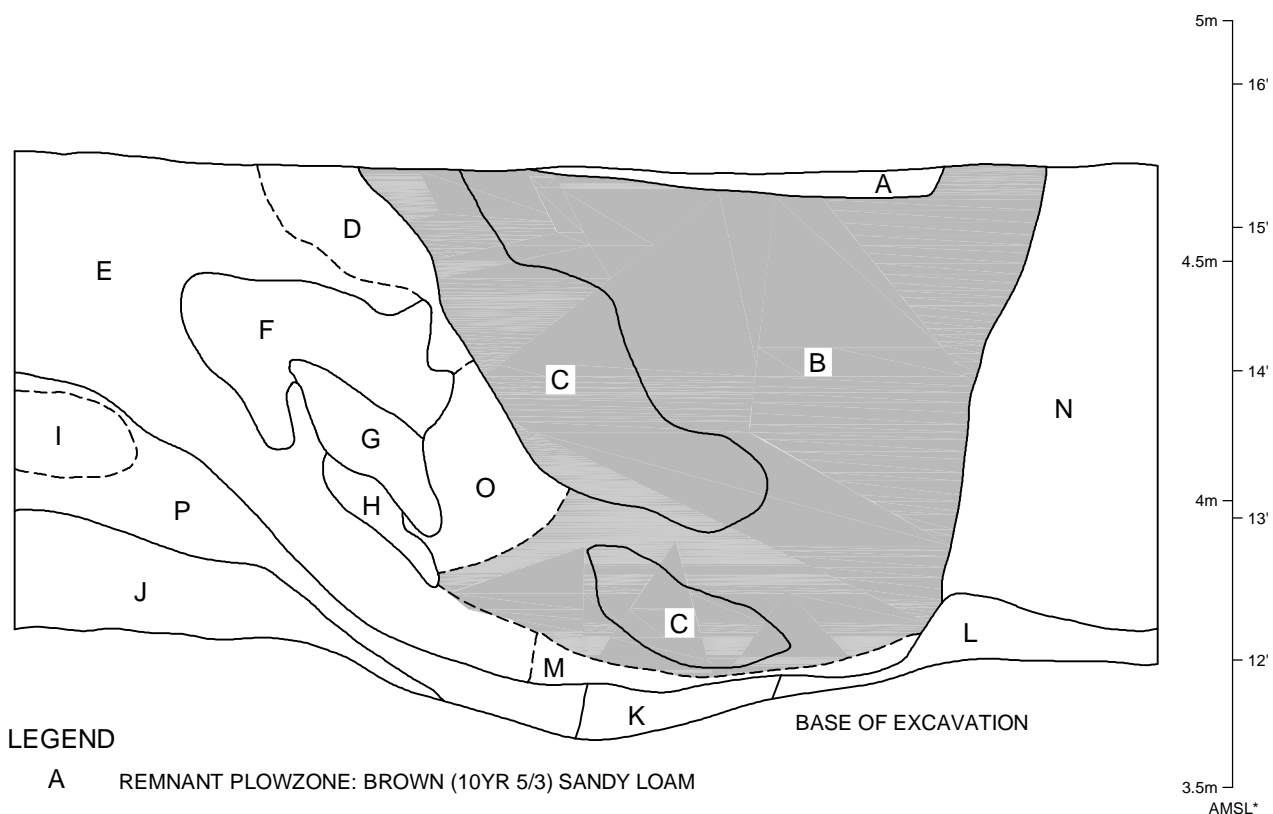
Feature 53 was located a few meters north of the Main Pit Cluster. On the surface it appeared to be roughly round, with a shallow extension or disturbance running off to the southeast; however, the



PLATE 18: Ceramic Ware Group Xla (Selden Island Type) from Feature 69, Silo Pit Area, Locus 1



PLATE 19: Feature 69, Locus 1



LEGEND

- A REMNANT PLOWZONE: BROWN (10YR 5/3) SANDY LOAM
- B FEATURE STRATUM A: YELLOWISH BROWN (10YR 5/4) LOAMY SAND MIXED WITH SOME LIGHT YELLOWISH BROWN (10YR 6/4) SANDY LOAM; CHARCOAL FLECKING
- C PART OF FEATURE STRATUM A: LIGHT OLIVE BROWN (2.5Y 5/4) LOAMY SAND MIXED WITH SOME YELLOWISH BROWN (10YR 5/6) LOAMY SAND
- D POSSIBLE RODENT DISTURBANCE: LOOSE YELLOWISH BROWN (10YR 5/6) LOAMY SAND MIXED WITH YELLOWISH BROWN (10YR 5/4) SANDY LOAM
- E COMPACT YELLOWISH BROWN (10YR 5/6) SANDY LOAM MIXED WITH BROWNISH YELLOW (10YR 6/6) SANDY CLAY LOAM
- F YELLOWISH BROWN (10YR 5/6) SANDY LOAM MIXED WITH YELLOWISH BROWN (10YR 5/8) SAND
- G YELLOWISH BROWN (10YR 5/6) SANDY LOAM MIXED WITH BROWNISH YELLOW (10YR 6/6) LOAMY SAND
- H BROWNISH YELLOW (10YR 6/8) MEDIUM SAND AND GRAVEL MIXED WITH YELLOWISH BROWN (10YR 5/6) SAND
- I YELLOWISH BROWN (10YR 5/6) MEDIUM SAND, 40 % GRAVEL
- J BROWNISH YELLOW (10YR 6/8) MEDIUM SAND LIGHTENING WITH DEPTH, WELL- DEVELOPED LAMELLAE
- K DARK YELLOWISH BROWN (10YR 4/6) MEDIUM SAND
- L BROWNISH YELLOW (10YR 6/8) MEDIUM TO FINE MICACEOUS SAND
- M YELLOWISH BROWN (10YR 5/4) LOAMY SAND
- N YELLOWISH BROWN (10YR 5/8) SANDY LOAM
- O DARK YELLOWISH BROWN (10YR 4/6) COMPACT SANDY LOAM WITH CHARCOAL FLECKING
- P YELLOWISH BROWN (10YR 5/8) MEDIUM SAND

*ABOVE MEAN SEA LEVEL



FIGURE 27: Stratigraphic Profile, Feature 39

extension turned out to be as deep as the rest of the feature, giving it a tear-drop shape. The feature was not stratified; the fill consisted of yellowish brown sandy loam, leached around the edge to brownish yellow. This soil was more even in color than that in most of the cultural pits, without the many small flecks of darker and lighter soil that characterized the cultural features. Feature 53 contained one chert and four quartzite flakes. The shape was quite irregular, with some parts of the edge sloping steeply and others sloping much more gradually. There was a deeper section, a sort of “point” in the very bottom. Analysis of the soil chemistry did not show any concentrations of elements such as phosphorus or calcium that might have come from cultural activity.

Feature 67 was one of a group of semicircular or “D-shaped” features distributed along the western edge of the Silo Pit area. This group included Features 70 to 73, 85, and 86. These features were thought to be natural disturbances, most likely tree falls, but because they composed a distinctive group, it was thought appropriate to sample some of them. In addition to Feature 67, Feature 85 was also sampled. Only the southern half of Feature 67 was excavated. The feature was not stratified, and the fill consisted of dark yellowish brown sandy loam. Three small flakes were recovered from the feature. Feature 67 is thought to have been a natural disturbance.

Feature 68 was a pit within Phase II Block 14. At the time it was excavated, a small group of potsherds was visible on the surface, and excavation was begun with the hope that it would be a rich, cultural pit. However, rodent disturbance was also visible on the surface, and below the surface this disturbance expanded to take up most of the feature. It appeared that the form of the feature at the time of the excavation had been created mostly by groundhog tunneling. A few more potsherds were found, but because of the extraordinary degree of rodent disturbance, the second half of the feature was not excavated.

Only the eastern half of Feature 85 was excavated. The feature contained two distinct fills. Most of the feature consisted of Stratum A, a yellowish brown sandy loam with small inclusions of darker and lighter soil. Beneath Stratum A was Stratum B, which was siltier and generally darker than Stratum A, with larger inclusions of subsoil. The boundary of the feature was somewhat irregular. A number of artifacts were recovered from the feature, including three small potsherds and 14 pieces of fire-cracked rock. The sherds were all tempered with steatite, like the approximately 100 sherds recovered from Feature 69 nearby. Because of the shape and irregular boundary of Feature 85, it is still thought to have been a natural disturbance.

3. *Excavations in the Buried Plowzone Area*

The Buried Plowzone area was located at the far western end of the Puncheon Run Site, 900 meters (2,950 feet) from the St. Jones River. The excavation area was about 40 meters from the present stream channel, on a nearly level area at the foot of the slope. The elevation of the excavated area was 4 meters (13 feet) amsl. The soils were somewhat siltier than those found in other parts of the site, and they had not been eroded and deflated like those in the rest of Locus 1. Instead, they had been built up by slope wash. As a result of this slope wash, the original plowzone was buried, and the artifacts in it were therefore protected from later plowing, providing better preservation conditions, especially for ceramics.

This area seems to have been used as a campsite by prehistoric peoples for at least 2,000 years, from before 800 BC to after AD 1000. What attracted people to this spot is not certain, but it is quite close to the bridge where South State Street, an old colonial road, crosses Puncheon Run, suggesting the location may have been a ford on an earlier Indian trail that ran along the St. Jones. Alternatively, or perhaps in addition, it may have been the highest point on Puncheon Run that could be reached easily by canoe.

a. Phase III Excavations

Because of the relatively high artifact counts and the wide variety of ceramic types, including experimental wares, further excavations were planned in the Buried Plowzone area during Phase III. The excavation plan was based on an understanding of the Buried Plowzone area as a specialized activity area where ceramics were used more intensely than elsewhere on the site. Since no features had been identified and the area had been plowed, the main goals of the excavation were to recover a larger sample of the ceramics and diagnostic tools to obtain chronological information.

Data recovery began with the systematic excavation of 1x1-meter units across the area, placed at 5-meter intervals, followed by the excavation of additional units in the richest area. A total of 20 units were used to delineate the concentration, followed by five additional units to explore two possible prehistoric features and eight to sample the area of highest ceramic density (Figure 28).

The Buried Plowzone area can be defined in two different ways because the extent of the buried plowzone deposit did not exactly match the extent of the artifact concentration associated with prehistoric activity in this area. The extent of the artifact concentration is clearly more important for occupational purposes, and it measured about 35 meters east to west and at least 15 meters north to south. To the west, the site had been disturbed by grading around a small pond. This area of disturbance marked the western boundary of the Buried Plowzone area and, therefore, of the Puncheon Run Site. The disturbance was visible in Unit 195, on the western margin of Block 16, and in Unit 262. The profiles of these units showed a truncated B-horizon and a plowzone mantled with gravelly fill overburden. To the north, both the deposit and the area of high artifact density were clearly bounded by shovel tests and Units 253 and 261, which were nearly sterile and lacked the buried plowzone. To the east, the artifact density fell off gradually, with the low counts typical of Locus 1 reached in Unit 267.

To the south and southeast, excavation was limited by the boundary of the project area, raising the possibility that the Buried Plowzone area was actually only part of a much broader artifact distribution that was primarily outside the highway corridor. Although the Cobble Bar area (discussed below in Section C.4) was 30 meters to the east of the Buried Plowzone area, cobble bars were present along Puncheon Run adjacent to the Buried Plowzone area, and debitage derived from cobble reduction was found in the Buried Plowzone excavation units. Within the right-of-way corridor, artifact totals between the Buried Plowzone and Cobble Bar areas were low. However, Puncheon Run was about 40 meters away from both excavations, and the dense distribution of cobble-derived debitage may well have continued closer to the creek, outside the project corridor, tying the two areas together. One of Berger's Phase I shovel tests was dug outside the project

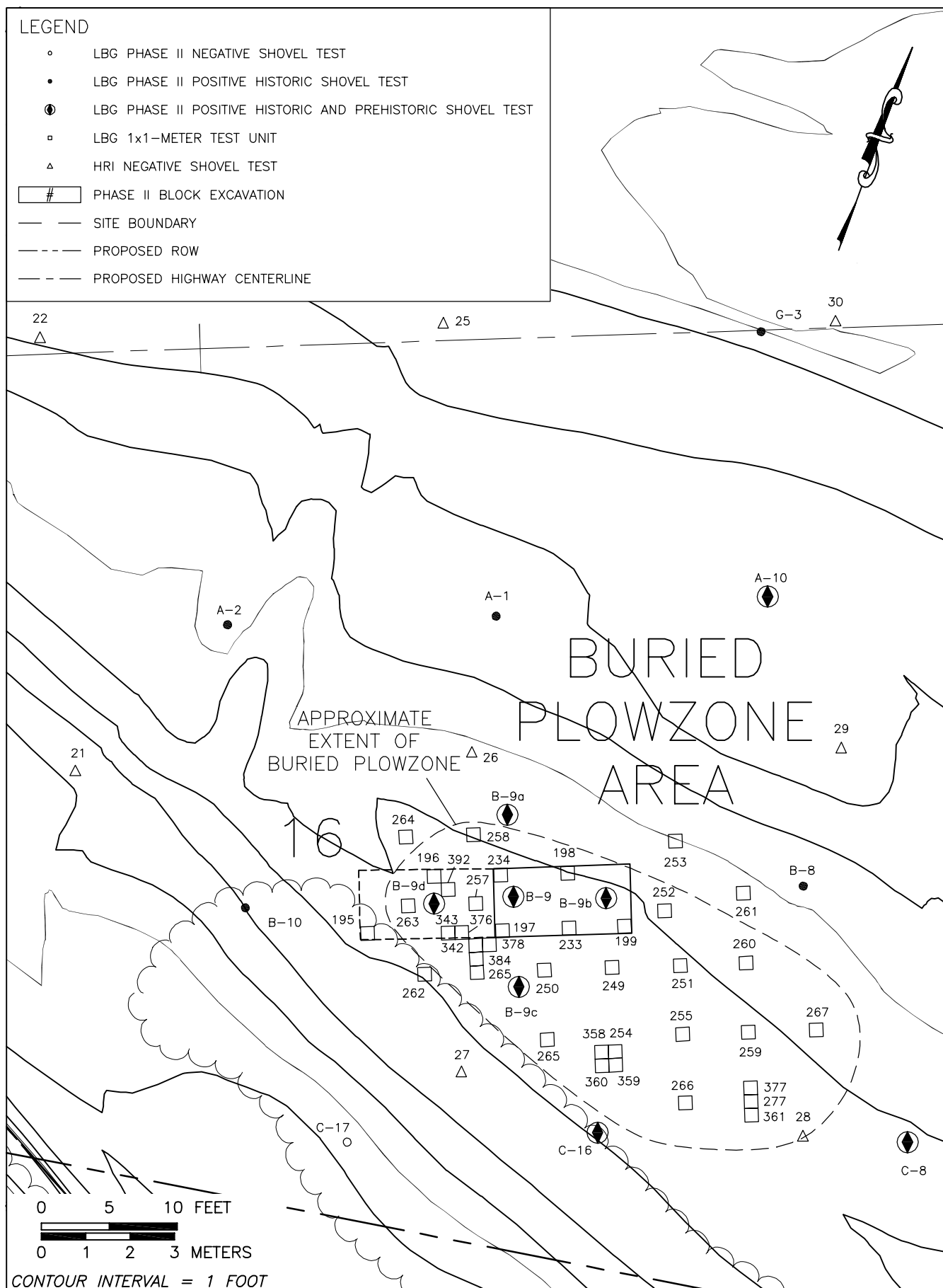


FIGURE 28: Plan of Excavations, Buried Plowzone Area

corridor in this area, and it yielded 50 pieces of debitage. The deposits in the Buried Plowzone area contained a more diverse artifact assemblage than those in the Cobble Bar area, with many more ceramics and formal tools. This concentration of ceramics and tools, items that were not present in the Cobble Bar area, measured about 15x35 meters, from the graded area to Unit 277.

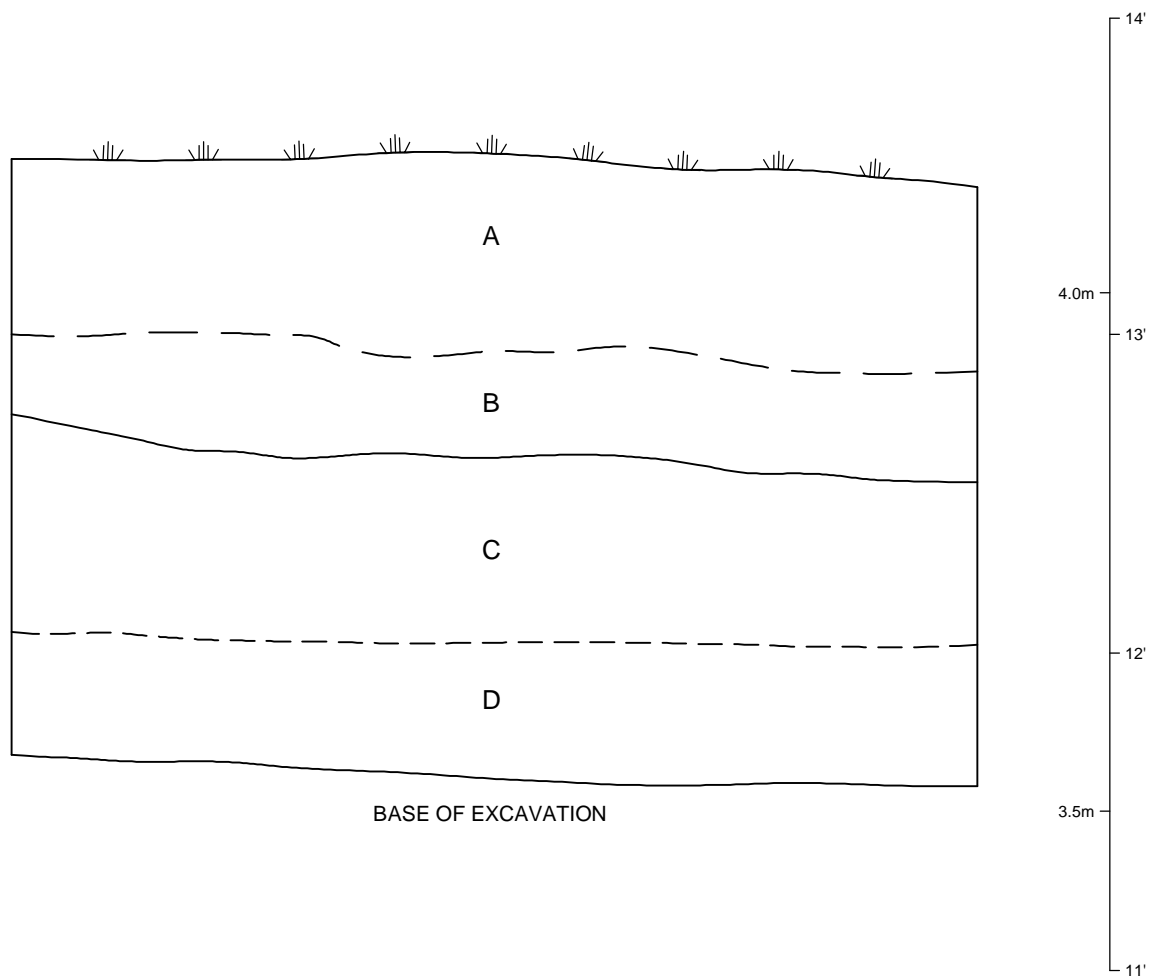
b. Stratigraphy

The soils in the Buried Plowzone area had a loamy to silty texture, rather different from the sandy soils found farther east. Although there were some signs of disturbance in this area, including wheel ruts and pieces of concrete on the surface, the profiles of the excavated units appeared to be largely intact. A detailed pedological description was made of the profile in a unit near the center of the excavated area; a representative profile is shown in Figure 29. This profile consisted of upper horizons of loam to sandy loam textures that gradually graded into lower subsoil horizons of silt loam texture. These horizons in turn rested upon a sandy clay loam substratum. What was designated by the archaeologists as Stratum A, the upper plowzone, actually appeared to be two separate horizons, (a shallow and a deep plowzone, or an old and young plowzone) (Ap1, Ap2), extending to a depth of 30 centimeters. These horizons were formed in historic slope wash deposits. The original surface (Ap3), designated Stratum B or the buried plowzone, was probably only subject to a relatively brief period of plowing before being effectively isolated by the accumulating slope wash. This is suggested both by its darker color relative to that of the overlying (Ap2-) horizon as well as by the fully intact upper subsoil horizonation beneath it. A darker color indicates higher organic matter content, which implies both less oxidative carbon loss due to tillage as well as possible residuals of the much higher organic matter concentrations typical of forested A-horizons. The buried plowzone contained the highest number of prehistoric artifacts, including the majority of the potsherds.

Beneath the third plowzone was an eluviated (E-) horizon, excavated as Stratum C, which was generally 8 to 14 centimeters thick but which varied greatly across this portion of the site, reaching more than 30 centimeters in thickness in Unit 257. The underlying horizonation also demonstrates minimum plowing of the lower plowzone, since prolonged plowing tends to eventually destroy E-horizons through incorporation with the surface horizon. When accompanied by tillage-induced soil erosion, upper transitional (BE-) horizons and even deeper argillic horizons may also in time be intercepted by a downwardly migrating plowzone. The E-horizon and all underlying horizons were developed in stratified Coastal Plain sediments of the Columbia Formation. Soil development was stronger than in the more coarse-textured soils occurring elsewhere in Locus 1, and the well-developed subsoil argillic horizons (Bt1, Bt2) were indicative of an advanced soil age extending to the Pleistocene. The top of the argillic horizon, excavated as Stratum D, was 76 centimeters below the surface in Unit 233. The argillic horizon contained only a few small prehistoric artifacts.

c. Artifacts

A total of 3,811 prehistoric artifacts were recovered in the Buried Plowzone area, consisting of 3,627 lithics (Table 12) and 184 ceramics. The artifacts represent an occupation of at least 1,800 years, from before 800 BC to after AD 1000, overlapping Delaware's Woodland I and Woodland II



LEGEND

- A STRATUM A, PLOWZONES FORMED IN HISTORIC SLOPEWASH: DARK YELLOWISH BROWN (10YR 4/4) SANDY LOAM
- B STRATUM B, BURIED PLOWZONE: DARK YELLOWISH BROWN (10YR 3/4) SANDY LOAM
- C STRATUM C, E-HORIZON: YELLOWISH BROWN (10YR 5/6) SANDY LOAM
- D STRATUM D, BE-HORIZON: DARK YELLOWISH BROWN (10YR 4/6) LOAM
- CLEAR BOUNDARY
- - - GRADUAL BOUNDARY
- - VAGUE BOUNDARY



FIGURE 29: Stratigraphic Profile, Unit 267, Buried Plowzone Area

TABLE 12: SUMMARY OF PREHISTORIC LITHIC ASSEMBLAGE, BURIED PLOWZONE AREA

ARTIFACT TYPE	RAW MATERIAL									TOTAL
	Chert	Jasper	Rhyo- lite	Argil- lite	Quartz	Quartzite	Chal- cedony	Sand- stone	Other	
Bifaces										
Projectile Points	4	9	1	.	1	.	.	.	.	15
Late-Stage Bifaces	1	.	3	.	1	.	.	.	.	5
Middle-Stage Bifaces	1	1	.	.	1	.	.	.	.	3
Early-Stage Bifaces	2	3	.	.	8	1	.	1	.	15
Other Bifaces	1	1	.	.	1	1	.			4
Unifaces										
Utilized Flakes	.	1	.	.	2	.	.	.	.	3
Cores										
Freehand Cores	2	4	.	.	8	3	.	.	.	17
Bipolar Cores	.	.	.	.	1	1	.	.	.	2
Flake Core	.	.	.	.	3	.	.	.	.	3
Bifacial Core	.	.	.	.	1	1	.	.	.	2
Other Cores	.	1	.	.	1	2	.	.	.	4
Tested Cobbles	7	1	.	.	13	14	.	2	.	37
Hammerstones	.	.	.	.	.	.	.	2	.	2
Debitage										
< 5 mm	.	1	.	.	2	.	.	.	.	3
6-10 mm	76	78	1	.	55	10	.	.	.	220
11-15 mm	317	278	1	2	247	59	1	.	2	907
16-20 mm	161	165	3	1	164	57	3	.	1	555
21-30 mm	105	102	2	2	141	44	4	.	2	402
41-40 mm	14	14		.	57	18	1	1	1	106
41-50 mm	9	3	.	.	18	4	.	.	.	34
51-60 mm	3	1	.	.	11	5	.	.	.	20
> 60 mm	1	.	1	.	3	1	.	.	.	6
Fire-Cracked Rock	130	67	1	.	280	253	.	245	286	1,262
TOTAL	834	730	13	5	1,019	474	9	251	292	3,627

periods. A few projectile points were complete enough for identification, including four narrow-bladed stemmed points (“pebble points”), one possible Fox Creek point, and two small triangular points (Plate 20). Fox Creek points are generally dated to AD 400 to 900, and triangular points usually date to the Woodland II period. In central Delaware, narrow-bladed stemmed points can date to any period from 4000 BC to AD 500 (Custer, Watson, and Silber 1996).

The vertical distributions of the ceramic and stone artifacts are shown in Figure 30. Prehistoric artifacts were recovered from the upper plowzone and the top two levels of Stratum C (the underlying E-horizon), but the greatest number came from the buried plowzone (Stratum B, or the Ap3-horizon). Although the diagnostic artifacts indicate use of the area during Delaware’s

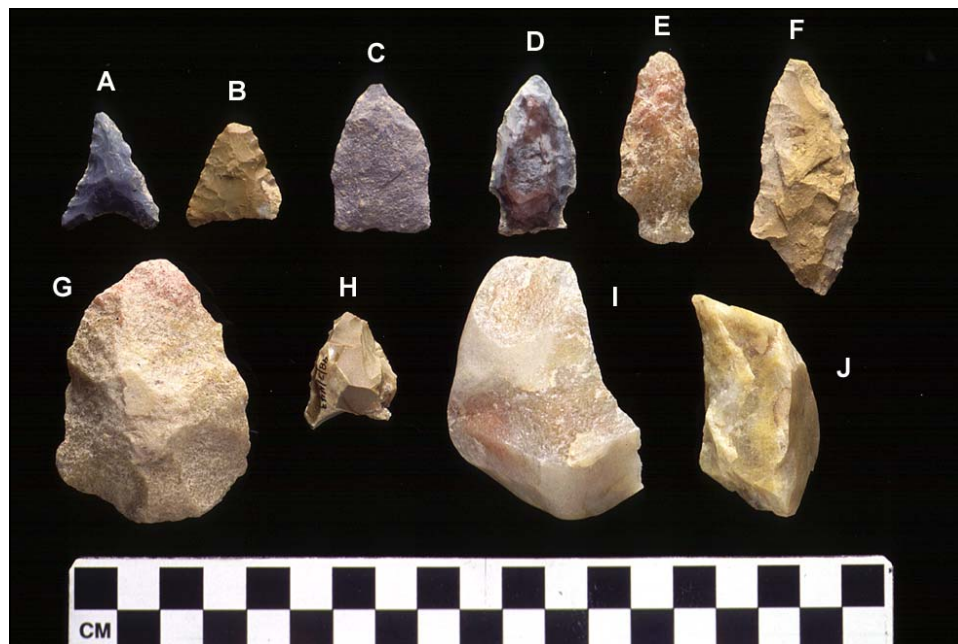


PLATE 20: Tools from the Buried Plowzone Area

A) chert Madison point, Cat. No. 98/2/356, B) jasper triangle point, Cat. No. 97/58/39, C) argillite Fox Creek point, Cat. No. 97/58/69, D) jasper stemmed point, Cat. No. 98/2/344, E) quartz stemmed point, Cat. No. 98/2/88, F) jasper stemmed point, Cat. No. 98/2/79, G) quartz early-stage biface, Cat. No. 98/2/36, H) jasper early-stage biface, Cat. No. 98/2/443, I) Gun Hill quartzite freehand core, Cat. No. 98/2/14, J) quartz freehand core, Cat. No. 98/2/433

Woodland I and Woodland II periods, there was scant evidence that deposits in the subplowzone strata were older than those in the plowzone.

Debitage accounted for the majority of the assemblage, and the dominant raw materials were, in descending order, quartz, chert, jasper, quartzite, and sandstone. These materials were all readily available in the nearby gravel bar, and much of the debitage undoubtedly derived from the initial reduction of cobbles found there. The artifacts related to such reduction included 37 tested cobbles, 17 freehand cores, 11 other cores, and 15 early-stage bifaces; 36 percent of the debitage had remnant cobble cortex. A discussion of the cobble industry, and its possible implications for settlement patterns, is included in the following section on the Cobble Bar area. Although cobble reduction was one of the activities conducted in the Buried Plowzone area, other artifacts show that it was not the only activity, or even necessarily the main one. Figure 31 shows that the curve of flake size distribution from this area is quite different from that of the Cobble Bar area. The Buried Plowzone area includes many more smaller flakes. These smaller flakes represent the final thinning of stone tools, or the resharpening of already finished tools, and they therefore indicate that a broader range of activities took place in the Buried Plowzone area than just cobble reduction. The three late-stage bifaces and the 14 projectile points also testify to other activities.

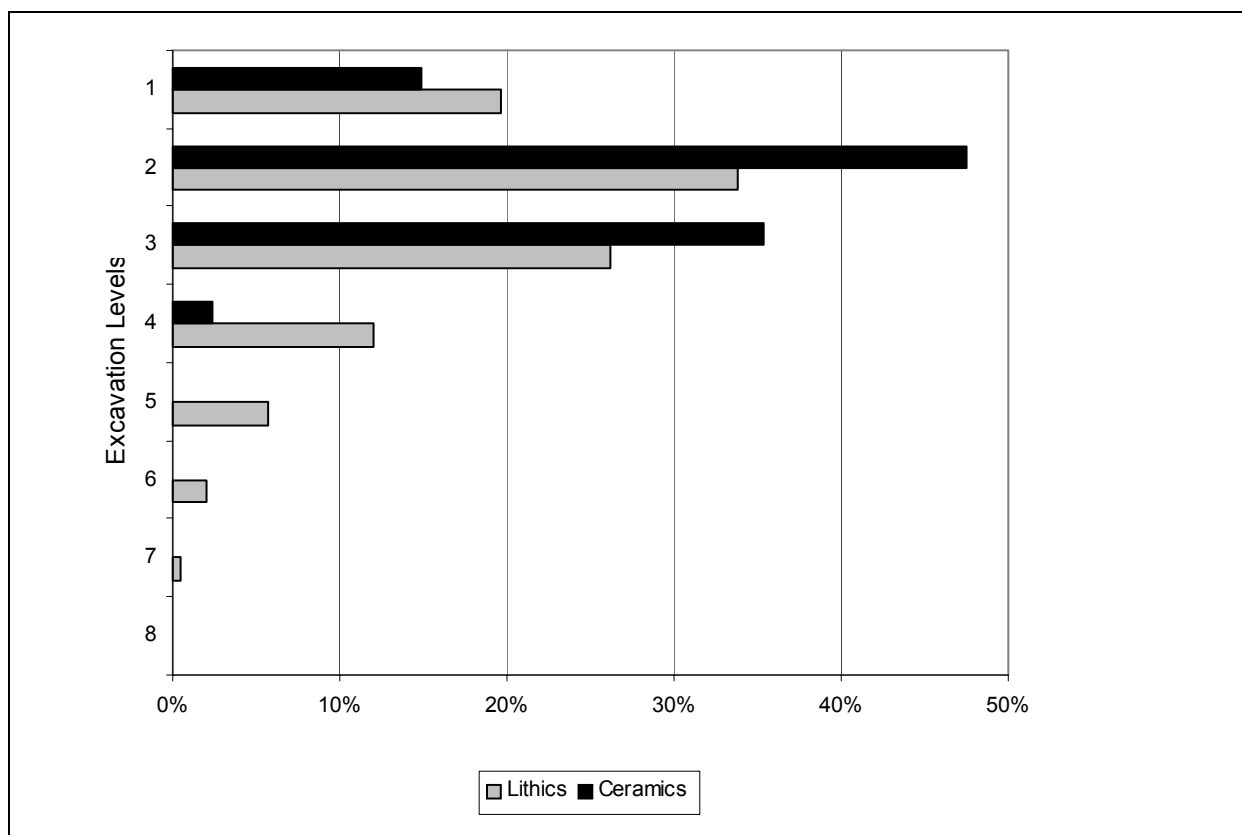


FIGURE 30: Relative Frequency of Ceramic and Lithic Artifacts by Excavation Levels, Buried Plowzone Area

A rather limited assortment of stone tools was found in the Buried Plowzone area. Fourteen artifacts identified as projectile points were found, but only six of these are intact or nearly so. No groundstone tools were found, and the only two cobble tools were hammerstones probably related to cobble reduction. The only unifaces were three retouched flakes. Edge wear analysis showed that a range of activities had taken place in the area (see Volume II, Appendix G). Of the 13 tools analyzed (Table 13), six showed evidence of scraping, including two used for scraping soft material, such as hides, one used on hard material, such as bone or antler, and three used on undetermined material; one of these had also been used for cutting. One utilized flake appeared to have been used to cut grass or other fibrous plants. Two other tools had been used for generalized cutting, which can include butchering. The two projectile points analyzed both had edge wear characteristic of projectile point use, confirming the identifications based on their overall form (see Appendix G, Volume II for details of edge-wear characteristics).

The most notable aspect of the Buried Plowzone area, compared to the other parts of the site, was the number of ceramic sherds recovered and the variety of wares they represent (Table 14). Only two parts of the site produced pottery in appreciable quantities: the Buried Plowzone area and Feature 69, on the western edge of the Silo Pit area. Feature 69, a pit that had been heavily disturbed by rodent tunneling, yielded more than 100 sherds, which may be the remains of only two vessels,

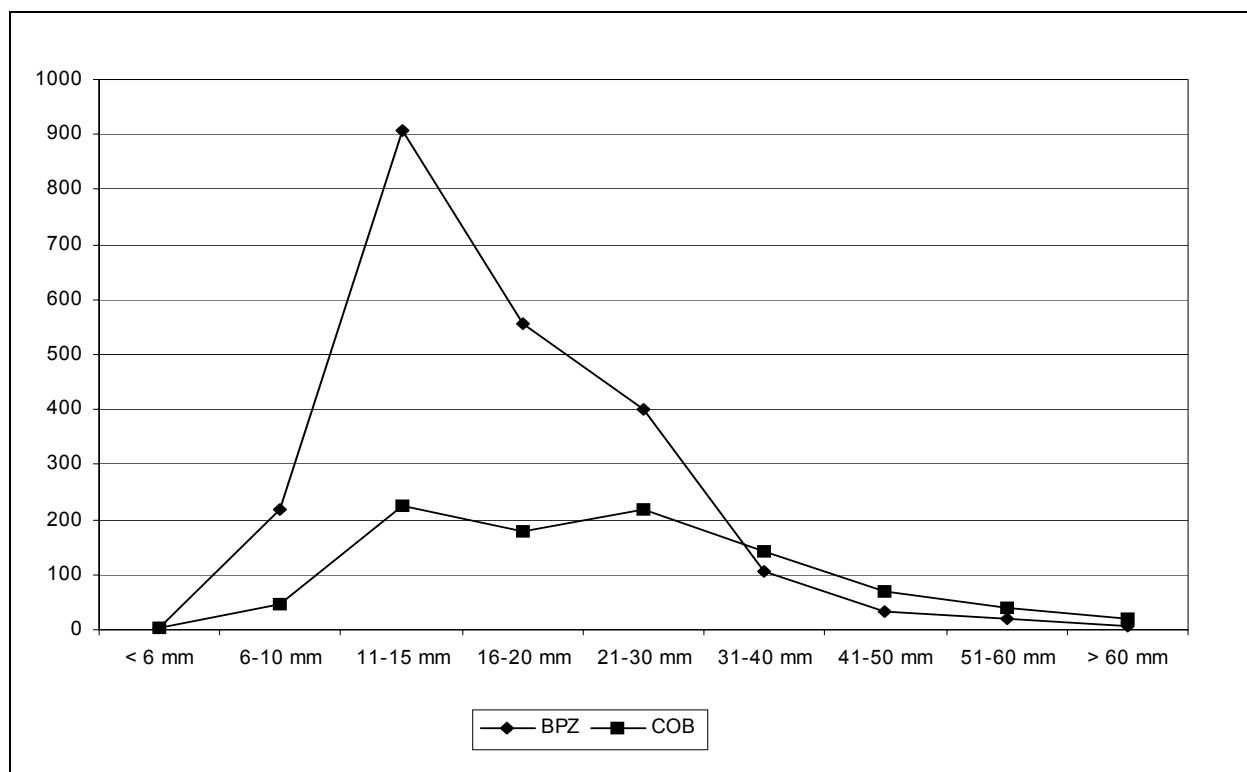


FIGURE 31: Flake Size Distribution, Buried Plowzone Area and Cobble Bar Area. Vertical axis shows actual debitage counts.

one Marcey Creek and one Selden Island. Otherwise there was only a thin scatter of sherds across the site. This difference can be explained in part by the preservation provided by the buried plowzone deposit (Table 15). Sherds that had been present in shallow deposits in other parts of the site had been plowed up and, in the course of 250 years of agriculture, pulverized. Yet this may not be the complete explanation. Other protected contexts were present on the site, including the silo pits, the large features in the Feature 30 block, and the buried deposits in the Metate block, and none of those areas yielded significant numbers of sherds. It is clear that ceramics were discarded much more frequently in the Buried Plowzone area than other areas of the site, reflecting a distinct pattern of landscape use, in comparison with other investigated areas.

The amount of pottery found in the Buried Plowzone area should not be exaggerated, as fewer than 100 sherds were large enough for identification. Considering that 40 1x1-meter units were excavated in this area, this is not a large assemblage. However, the ceramic assemblage covers a lengthy time span and includes 14 ware types and subtypes, as listed in Table 14. Some of these wares correspond to known types, but there are also some experimental wares. Two of the earliest types of pottery in Delaware, Marcey Creek and Selden Island, were both represented; these steatite-tempered wares are usually dated from 1200 to 800 BC. The two main wares of the next period, Wolfe Neck and Coulbourn, were also identified. Coulbourn, which is tempered with chunks of clay or pieces of ground-up pots, dates to around 500 to 100 BC (Plate 21 a, b). Wolfe Neck (700-400

TABLE 13: USE-WEAR ANALYSIS OF TOOLS FROM THE BURIED PLOWZONE AREA

Tool Form	Material	Context	Inferred Activity
Projectile Point	chert	Unit 196, A-1	projectile point use
Projectile Point	jasper	Unit 191, B-4	projectile point use
Utilized Flake	jasper	Unit 266, B-2	scraping
Utilized Flake	chert	Unit 266, B-2	cutting?
Utilized Flake	jasper	Unit 256, B-4	scraping soft materials
Utilized Flake	chert	Unit 266, B-2	scraping soft materials
Early-Stage Biface	jasper	Unit 277, A-1	scraping hard materials
Utilized Flake	chert	Unit 254, B-2	cutting
Early-Stage Biface	chert	Unit 384, A-1	cutting
Utilized Flake	chert	STP B-9d, B	cutting, possibly grass
Middle-Stage Biface	jasper	STP C-15, A	no use-wear
Projectile Point Fragment	jasper	Unit 371, B-2	scraping medium/hard materials
Projectile Point Fragment	rhyolite	Unit 257, C-4	scraping?

BC) is tempered with pieces of crushed quartz, and it is the first in a long series of wares tempered with crushed rock or grit that extends through Popes Creek (500 BC to AD 250) and Hell Island (AD 600 to 1000), to Minguannan (AD 1000 to 1600). These grit-tempered wares can be difficult to type, but sherds identified as both Hell Island (Plate 21 c, d) and Wolfe Neck were found in the Buried Plowzone area. Shell-tempering was introduced into Delaware around AD 100 in the Mockley type (Plate 21 i), which may be ancestral to the Woodland II Townsend variety; both of these types were also identified in the Buried Plowzone area. One particularly interesting group of sherds, designated Group III, was found in Stratum C (subplowzone E-horizon) of Unit 392. These 11 sherds were tempered with fine sand well distributed through the paste. The exterior was impressed with a loosely woven fabric, the interior was smooth, and the rim was decorated with cordwrapped stick impressions. The sherds were tightly curved, suggesting a small globular vessel no more than 10 centimeters (4 inches) in diameter. Although the form resembled miniature Woodland II vessels, the paste resembles Early Woodland types such as Accokeek, including a group of sherds from Lums Pond dated to about 800 BC (Petraglia et al. 1998). The stratigraphic position of these sherds suggests that the earlier date is more likely although there was only a tendency for earlier ceramic types to be found deeper in the profile (Table 15).

Two radiocarbon dates were obtained from the Buried Plowzone area (Table 16): one from charcoal found in the E-horizon or Stratum C of Unit 250, the lowest cultural level, and one in Feature 14, which clearly underlay the main artifact deposits. The date from Stratum C was 2,830±70 years BP (Beta-131142), and the date from Feature 14 was 2,920±40 years BP (Beta-136092). Together, these dates suggest a possible early use of the area around 1000 BC, followed by periodic occupational episodes extending to after AD1000.

TABLE 14: CERAMICS FROM THE BURIED PLOWZONE AREA

Ware Type	Common Name	Temper	Surface Treatment	No. of Sherds	Context(s)
Ia	Coulbourn (?)	sand (1%)	cordmarked	4	Unit 255, A-1 Unit 259, B-2 (2) Unit 360, B-2
Ib	Coulbourn (?)	sand and grog	cordmarked	4	Block 16, B/C Unit 250, A-1 Unit 257, C-3 (2)
Ic		sand and mica	cordmarked	1	Unit 360, B-2
II	Hell Island (?)	sand (1-10%)	cordmarked	8	Block 16, B/C (2) Unit 196, A-2 (2) Unit 233, A-1 (2) Unit 258, A-1 Unit 377, A-1
III	Accokeek	fine sand	fabric impressed, cordwrapped stick impressions on rim	11	Unit 392, C-3
IV		crushed stone	cordmarked and net impressed	3	Unit 250, C-3 Unit 263, B-3 Unit 277, C-4
V	Coulbourn	clay or sherd	cordmarked and net impressed	1	Unit 196, A-2
VIa	Wolfe Neck	large fragments of crushed quartz	cordmarked and net impressed	1	Unit 196, A-1
VIb	Wolfe Neck related	crushed quartz	cordmarked and net impressed	2	Unit 384, B-2
VIII	Hell Island	small fragments of crushed quartz and mica	cordmarked, fabric impressed, and smoothed	2	Unit 198, A-1 Unit 392, A-1
IX	Mockley	shell (10%)	cordmarked and smoothed	10	Unit 376, C-3
X	Townsend	finely crushed shell (<5%)	smoothed, cordmarked, and net impressed	8	Block 16, B/C Unit 195, B-2 Unit 196, A-1 (3) Unit 260, B-2 Unit 343, C-3
XIa	Selden Island	steatite	smoothed	1	Unit 197, B-2
XIb	Marcey Creek	steatite	smoothed	1	Unit 384, B-2

TABLE 15: CERAMICS FROM THE BURIED PLOWZONE AREA BY STRATUM

Stratum	Ware Type														Total
	Ia	Ib	Ic	II	III	IV	V	VIa	VIb	VIII	IX	X	XIa	XIb	
A - Plowzone	1	1		4				1		2		3			12
B - Buried Plowzone	3		1	2			1		2			2	1	1	13
C - Subsoil		3		2	11	3					10	3			32
Total	4	4	1	8	11	3	1	1	2	2	10	8	1	1	57

TABLE 16: RADIOCARBON DATES FROM LOCUS 1, BURIED PLOWZONE AREA

Context	Lab Number	Analysis	Radiocarbon Age	Calibrated Date (95%Probability)
Unit 250, C-3	Beta-131142	AMS	2,830±70	1205 to 825 BC
Unit 277, Fea. 14, C-12	Beta-136092	AMS	2,920±40	1260 to 995 BC

Many different wares were identified in the Buried Plowzone area, and there were generally only a few sherds from each type. Two of the most common types overall, Mockley and the sand-tempered Group III, were found in tight concentrations that probably derive from single pots. Only one to four sherds of most of the other groups were found, although a total of seven sherds of Townsend ware were recovered from various contexts in the Buried Plowzone area.

Although sherds from vessels dating to every part of the 1000 BC to AD 1200 period were found in the Buried Plowzone area, they represented very few vessels. Therefore, the initial assumption on which the Phase III excavations were based, that this area represented a special activity area where ceramics were used rather intensively, does not appear to have been correct. If the area was used on a regular basis, ceramics were certainly not used intensively, or more vessels would have been broken. Either ceramic pots were used only very occasionally in the area, or they were used in such a way that they were rarely broken. This could mean that the Buried Plowzone area represents a few episodes of camping, separated by centuries. However, the artifacts recovered are



PLATE 21: Ceramics from the Buried Plowzone Area

A) Ware Group I (Coulbourne type), Cat. No. 98/2/88, B) Ware Group I (Coulbourne type), Cat. No. 98/2/50, C) Ware Group II (Hell Island type), Cat. No. 97/58/69, D) Ware Group II (Hell Island type), Cat. No. 97/58/58, E) Ware Group IV, Cat. No. 98/2/71, F) Ware Group IV, Cat. No. 98/2/71, G) Ware Group IV, Cat. No. 98/2/14, H) Ware Group IV, Cat. No. 98/2/553, I) Ware Group IX (Meckley type), Cat. No. 98/2/425

rather evenly distributed across the 2,000-year span of the occupation, suggesting some use in each part of that period. The simplest cultural explanation for such a distribution would be that people came to the site periodically but usually very briefly, and that during their stays, they did not use their pots in ways that were likely to break them. The concentration of ceramics at this location may be at least partially related to unusual preservation conditions in the Buried Plowzone area, in addition to some unknown pattern of landscape use.

The horizontal distribution of the stone artifacts in the Buried Plowzone area (Figure 32) falls into two distinct concentrations, separated by a band running southwest to northeast within which very few artifacts were found. This area of low artifact density corresponded to a very slight depression that would have been somewhat deeper in prehistoric times, since the units had plowzones 5 to 10 centimeters thicker than those in the artifact-rich areas. This lower area may have been a little damp, so that people tended to camp on either side of it. No major differences were noted between the artifacts on the two sides, although quartz and quartzite debitage was somewhat more frequent in the western zone and jasper more frequent in the eastern zone.

d. Features

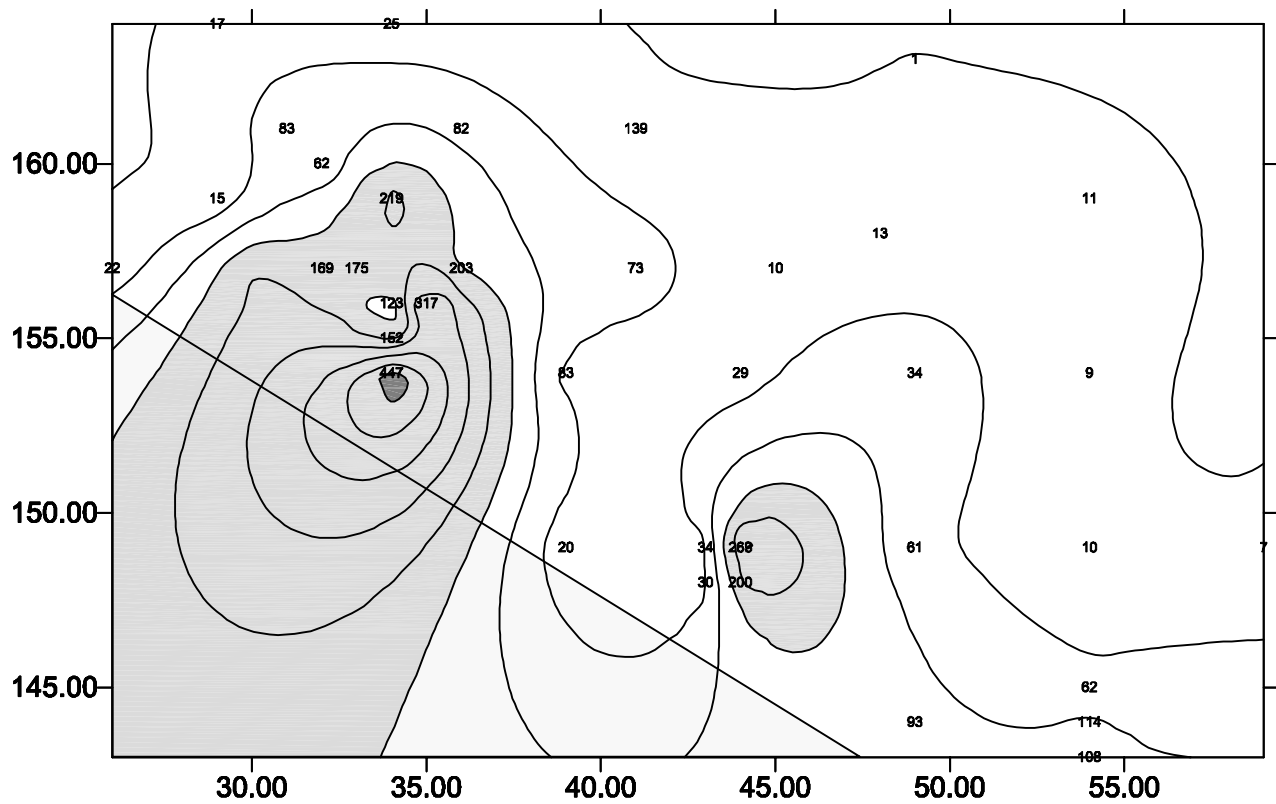
Six feature numbers were identified in the Buried Plowzone area (Table 17), but all were eventually determined to be noncultural or historic. Feature 10, which was investigated as a possible hearth, was probably only an extension of the cobble bar that underlay some of the soils along the excavated area's southern boundary, possibly pulled to the surface by a tree throw (Small et al. 1990).

e. Feature 14, a Large Soil Anomaly

One feature that merits discussion is Feature 14, a large, deep anomaly initially identified in Unit 277. Because the anomaly extended beyond the unit in all directions, two additional units were excavated north and south of the first unit. Together, these three units exposed the complete north-south profile of the feature (Figure 33), but neither its eastern nor western boundary was delineated. The feature fill, a loose yellowish brown sandy loam largely devoid of gravels, terminated at about 1.2 meters below ground surface. (The feature's base had to be located with a split spoon because the water table was only 1.1 meters below the surface.) The feature fill resembled the E-horizon in nearby units and included a few large chert and jasper flakes and tested quartz cobbles. In its shape and the character of its fill, Feature 14 resembled some of the large basin features identified across the St. Jones River at the Hickory Bluff Site.

TABLE 17: FEATURES IN THE BURIED PLOWZONE AREA

Feature	Location	Description
9	Unit 256	Cobble bar deposit
10	Unit 254	Cobble bar deposit
11	Unit 257	Rodent disturbance
12	Block 16	Historic post
13	Block 16	Historic post
14	Unit 277	Large soil anomaly



Puncheon Run Buried Plowzone Area
 Distribution of Lithic Artifacts
 Contour Interval is 50

FIGURE 32: Horizontal Distribution of Stone Artifacts, Buried Plowzone Area

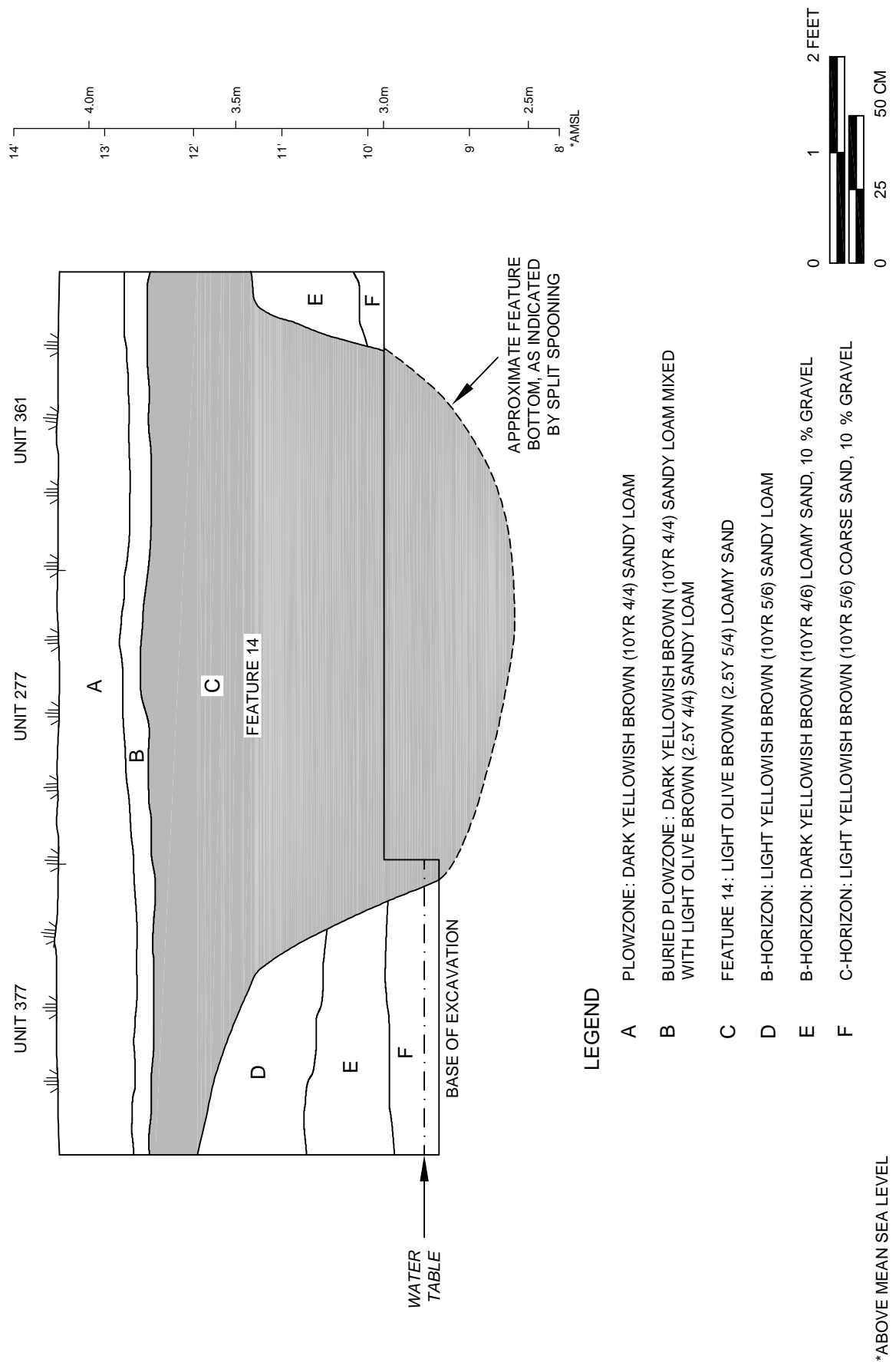


FIGURE 33: Stratigraphic Profile, Feature 14

A charcoal sample from Feature 14 Level 12 returned a radiocarbon date of 2,920±40 BP (Beta-136092). Chemical analysis of the feature soils and an adjacent control column did not show any evidence of cultural activity; the levels of phosphorus, calcium, and strontium in the feature were all within the range of the control column.

The origin of Feature 14 was not clear and was the subject of much debate. Pedologist Dr. Daniel Wagner believed that there was a deep, ancient, silty soil anomaly here, possibly related to the braided stream that occupied the Puncheon Run valley during parts of the Pleistocene epoch. However, he also identified a zone of younger soil that appeared to represent an excavation into the older silty anomaly. The boundaries he drew for this excavation, based on the degree of soil development, differed from the boundaries established by the archaeologists, and the pedological boundaries did not match the artifact distribution. Artifacts were found below the excavation Dr. Wagner identified, in soils he believed were Pleistocene in age, and the charcoal sample, from which the radiocarbon date was obtained, was collected from these ancient-looking soils. Dr. Wagner's view also required accepting that a feature of some kind, whether cultural or natural, happened to be formed right on top of the deep, silty anomaly—a striking coincidence that was later repeated at Feature 39 in the Silo Pit area.

It was clear that Feature 14 was older than the main occupation of this area. The basic vertical artifact distribution characteristic of the Buried Plowzone area (see Figure 30), with a peak in the buried plowzone and the top subplowzone level, was present across the top of Feature 14. Therefore, the radiocarbon date from deep in the feature helps to set a beginning date for that occupation. Artifacts were also present in the Feature 14 to a depth of 120 centimeters below the ground surface. These artifacts either date to an earlier occupation or were somehow incorporated into the feature fill. Some of the artifacts in the feature were rather large, including a quartz biface, and these larger artifacts are less likely to have migrated substantial distances through the soil.

Because the top of the feature did not have a clear edge, its shape could not be determined. For this reason, and because of the complexity of the feature's internal soil development, it is not possible to specify the origin of Feature 14. A cultural origin is possible, but far from certain.

f. Interpretation

The Buried Plowzone area represents a camping area used repeatedly but sporadically for at least 2,000 years. Relative to the entire Puncheon Run Site, this area contains the greatest concentration of ceramics, suggesting that it was a specialized activity area involving ceramic use. Such use of ceramic vessels may have embraced practical everyday concerns (cooking and food storage) or perhaps ritual and ceremonial activities (celebrating successful hunts, initiations, life events; invocations of spirit beings and ancestors). But the actual quantity of ceramics, and the number of vessels they represent, is so small that these interpretations are speculative. The only activity for which there is substantial evidence at the Buried Plowzone area is the manufacture of stone tools from cobbles found in the bars along Puncheon Run. Otherwise the assemblage suggests diverse activities, none pursued intently, including scraping soft materials, such as hides and antler; cutting, especially fibrous material, such as grass; and possibly butchering. The diagnostic artifacts are distributed rather evenly across the period, so use of this area seems to have been fairly constant.

An interpretation as a way-station on a well-traveled path seems to fit the evidence best. People journeying on foot to or from the mouth of the St. Jones would not have walked directly adjacent to the river, because the streams entering the river all broaden out into substantial wetlands. Instead, they would have walked a distance inland, where the streams were fordable. South State Street, the old colonial road, runs just 50 meters (160 feet) west of the Buried Plowzone area, and we know that colonial roads often followed earlier Indian trails. It is also possible that the vicinity of the Buried Plowzone area might have been the highest point on Puncheon Run that could be reached by canoe; certainly that point was probably within 100 meters (330 feet) of this area, providing another reason for people to pass through. Alternatively, there may have been a springhead nearby, now extinct. Tools were found here because people may have paused on their travels to butcher a deer that strayed onto their paths. Pottery was found here because pots being carried through were sometimes broken. The presence of exposed cobbles may also have attracted people, and the hypothetical trail may have taken a small detour to pass by the gravel bars.

4. Excavations in the Cobble Bar Area

The Cobble Bar area was initially identified during Berger's Phase II testing, following the placement of a 5x20-meter sample block (Block 15) in an area that had produced high densities of debitage, tested cobbles, cores, staged bifaces, and hammerstones. The area was located along the southern boundary of the project area, at the boundary of the old fields and the woods along Puncheon Run, 40 meters from the stream. The elevation was 3.75 meters (12 feet) above sea level.

This area was selected for inclusion in the final data recovery program (Phase III) because of its distinct character. It appeared to be a quarry reduction area for cobbles obtained in gravel beds along Puncheon Run. The Phase III plan was to obtain a greater sample of material from this workshop to study for insights into the activities that went on there and the relationship between this area and the rest of the Puncheon Run Site.

a. Phase III Excavations

Phase III data recovery excavations were planned for this location to sample the deposits associated with quarry reduction activities centered on the cobble bar. Final plans for the Puncheon Run Connector showed that the highest artifact density area, the southwest corner of Block 15, was actually outside the project right-of-way. The 3x3-meter block proposed for the Phase III excavations was therefore placed at the northwest corner of Block 15 (Figure 34), the closest point within the project area to the artifact concentration. The combined Phase II and Phase III sample of this area included 14 1x1-meter units, which yielded a total of 1,216 prehistoric artifacts, nearly 50 percent of which were recovered from the plowzone. No features were identified. The Phase III units yielded significantly fewer artifacts on average than the Phase II units; as expected, the Phase III block seems to have been on the edge of the high artifact density area.

b. Stratigraphy

The Cobble Bar area was mantled with a single plowzone, 25 to 30 centimeters thick and composed of gravelly sandy loam. Due to the very gravelly soil, subsoil development was weak, with little

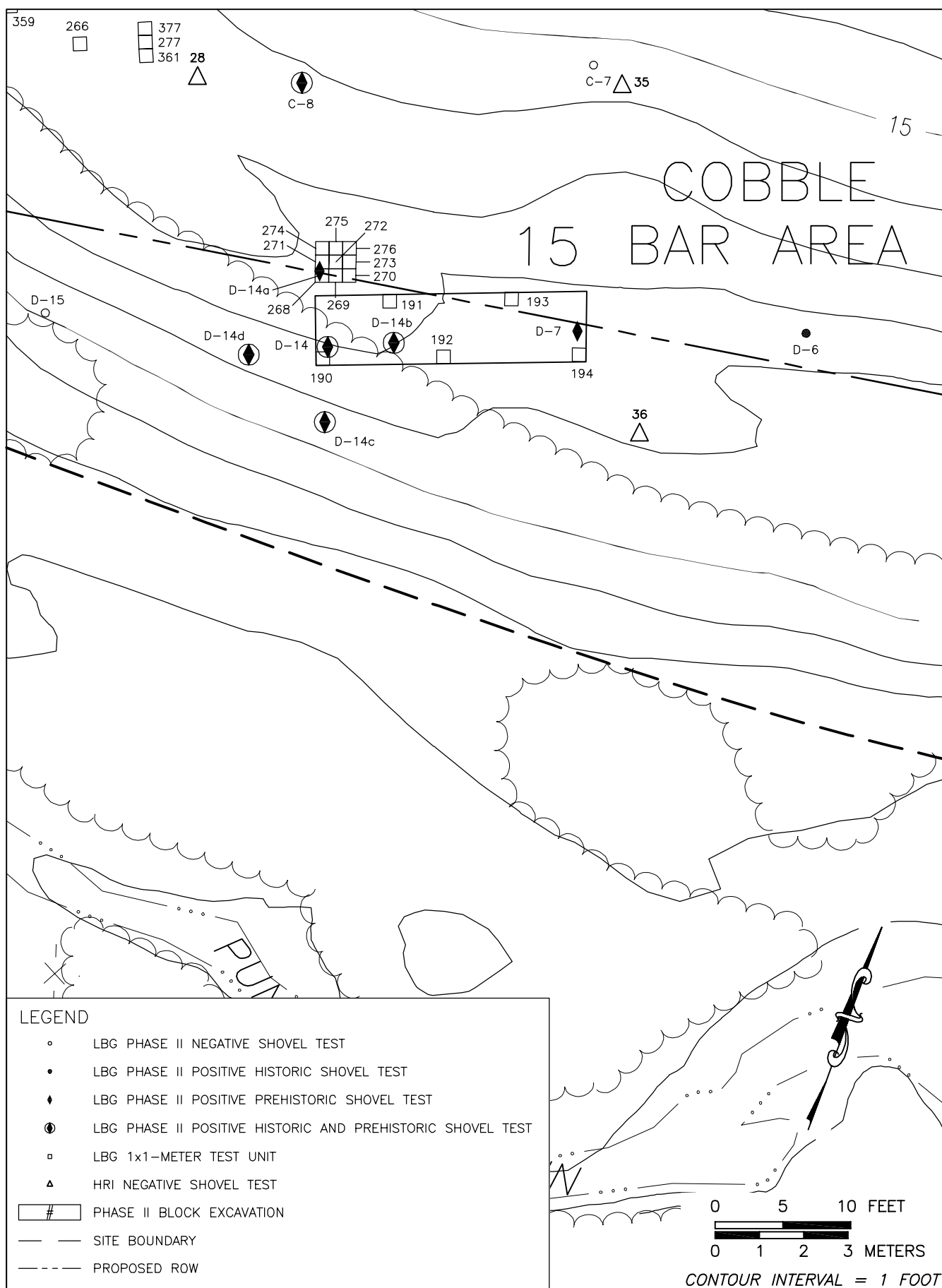


FIGURE 34: Plan of Excavations, Cobble Bar Area

clay accumulation and no clay skins. An eluviated (E-) horizon separated the organic Ap-horizon from the weak B-horizon, which originated about 60 centimeters below ground surface. A very gravelly sand characterized the parent C-horizon, containing abundant pebbles and cobbles. It was this material, exposed on the surface through tree throws, rodent burrowing, and the incising action of Puncheon Run, that undoubtedly accounts for the high frequency of lithic artifacts recovered in this area of the site, as prehistoric flint-knappers tested available cobbles for suitability, and used acceptable ones for tool manufacture.

c. Discussion

Five diagnostic artifacts were recovered from the Cobble Bar area (Plate 22), three of which were projectile points. One resembled a fishtail point, a form dated by Ritchie (1980:154) to circa 1050 to 750 BC; one contracting-stemmed point resembled a Rossville point, a form dated by Dent (1995:228) to circa 1500 to 500 BC; and the third was a Woodland II (Late Woodland) triangular point. One sherd of Woodland II Townsend pottery was also found, along with a very small sherd

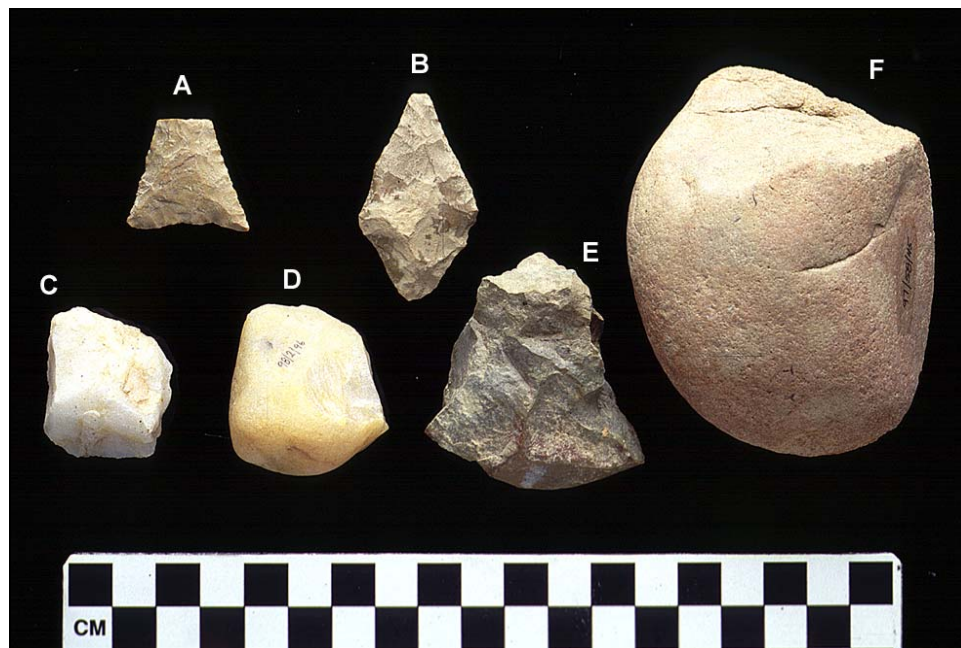


PLATE 22: Tools from the Cobble Bar Area

A) jasper Levanna point, Cat. No. 97/58/27, B) jasper stemmed point, Cat. No. 97/58/33, C) quartz freehand core, Cat. No. 98/2/81, D) quartz freehand core, Cat. No. 98/2/96, E) chert freehand core, Cat. No. 98/2/96, F) sandstone hammerstone, Cat. No. 97/58/45.

of what appeared to be clay-tempered Coulbourn pottery, usually dated to 500 to 100 BC. Two battered stemmed points were also recovered, neither reliably typable. Deposits of cobble-derived flakes and bifaces similar to those from the Cobble Bar were found in the Buried Plowzone area 30 meters to the west, where they were associated with a larger sample of diagnostic artifacts spanning the same period. The artifacts from the Cobble Bar and Buried Plowzone areas were somewhat

different (see below), but taken together they clearly show use of these gravel bars from before 800 BC to after AD 1000. The materials from the Cobble Bar excavation could date to any time in this long period, and occupation could have occurred before or after the periods represented by the few diagnostic artifacts.

The Buried Plowzone area produced evidence of other activities besides lithic procurement, including ceramics and a variety of stone tools. The Cobble Bar produced much less evidence of domestic activity but enough to show that someone did camp on this spot (Table 18), including eight projectile points, three potsherds, eight utilized flakes, and 142 pieces of fire-cracked rock. The only tool from this area inspected for microscopic use-wear, a jasper late-stage biface (Unit 269), showed evidence of both scraping and cutting. The relatively high frequencies of cores and debitage in the collection show that stone procurement was almost certainly the main purpose of visits to this area.

TABLE 18: SUMMARY OF PREHISTORIC ASSEMBLAGE, COBBLE BAR AREA

ARTIFACT TYPE	RAW MATERIAL									TOTAL
	Chert	Jasper	Rhyo- lite	Argil- lite	Quartz	Quartzite	Iron- stone	Sand- stone	Other	
Bifaces										
Projectile Points	.	6	.	1	1	.	.	.	.	8
Middle-Stage Bifaces	.	.	.	.	.	1	.	.	.	1
Early-Stage Bifaces	1	.	.	.	2	.	.	.	.	3
Unifaces										
Utilized Flakes	7	2	.	.	.	.	.	.	.	9
Cores										
Freehand Cores	2	2	1	.	14	2	.	.	1	22
Bipolar Cores	1	3	.	.	1	1	.	.	.	6
Flake Cores	1	.	.	.	1	.	.	.	.	2
Bifacial Cores	1	.	.	.	2	.	.	.	.	3
Other Cores	1	2	.	.	.	.	.	.	.	3
Tested Cobbles	13	7	.	.	26	25	.	.	.	71
Hammerstone	.	.	.	.	.	.	.	1	.	1
Debitage										
<6 mm	1	1	.	.	1	.	.	.	.	3
6-10 mm	20	8	.	.	17	1	.	.	1	47
11-15 mm	91	42	1	.	68	22	1	.	1	226
16-20 mm	60	33	1	.	65	19	.	.	1	179
21-30 mm	55	24	4	.	94	37	1	.	2	217
31-40 mm	28	14	1	.	68	26	1	1	3	142
41-50 mm	16	6	.	.	30	18	.	.	1	71
51-60 mm	9	.	1	.	15	9	.	3	2	39
>60 mm	5	.	.	.	5	8	.	.	1	19
Fire-Cracked Rock	24	6	.	.	21	51	10	23	7	142
Ceramic	.	.	.	.	.	.	.	.	.	4
TOTAL	336	156	9	1	431	220	13	28	20	1,218

d. *Lithic Analysis*

The primary purpose of the Phase III excavations in the Cobble Bar area was to obtain a sample of the cobble-derived lithic material, so that it could be studied for insights into prehistoric lithic procurement and cobble reduction strategies. Knowledge of lithic procurement, in turn, can be used to study the settlement patterns of the residents and the place of the Puncheon Run gravel bars in their overall economic strategy.

Size-grade analysis of the debitage indicates that early reduction of cobbles was the main activity in this location; compared to other parts of Puncheon Run, there were more large flakes and fewer small flakes, and a higher percentage of the debitage had cobble cortex. The large number of cores—more, proportionally, than anywhere else at the Puncheon Run Site—confirms this hypothesis. The main raw materials were those readily available in the gravels: quartz, chert, quartzite, and jasper. Interestingly, although quartz was the main material in the debitage, most of the projectile points were jasper, suggesting that jasper was the preferred material for point-making.

Analysis of the place of the Cobble Bar area in the prehistoric settlement pattern was guided by the argument of Parry and Kelly (1987) that lithic technologies correlate with important cultural distinctions. Parry and Kelly emphasize the distinction between *curated* and *expedient* technologies. A curated technology includes large numbers of bifacial tools made in a carefully standardized way from flakes or blades struck off prepared cores. In an expedient technology, most tools are unmodified flakes struck off unprepared cores, and there are few bifaces or other formal tools. Flakes are struck off cores in an almost random way, and there is no distinction between tools and waste; all of the resulting flakes are potential tools. According to Parry and Kelly, curated technologies are generally associated with highly mobile populations, whereas expedient technologies are associated with more sedentary groups:

Stones weigh too much for a mobile people to carry more of them than are needed, yet neither tool needs nor raw material availability can always be precisely anticipated. Therefore, mobility simultaneously plays a part in dictating tool needs and access to raw material. In areas where suitable raw materials are not abundant, mobile populations must use tools designed to overcome the potential lack of local raw materials, through the use of bifaces or other standardized, portable tools and cores.

For relatively sedentary peoples who do not move long distances . . . stone tools must only insure that some amount of usable stone be available at the locations where it is needed. If raw material is abundant, and readily yields edges of adequate sharpness and durability for the task at hand, then there is no need to manufacture portable lithic tools [Parry and Kelly 1987:300].

While many cultures cannot be clearly identified as either mobile or sedentary, and many technologies cannot be clearly identified as either curated or expedient, analysis of the recovered lithic artifacts was pursued for possible insights into the Woodland I settlement pattern, which was an important research goal for this study.

Another caveat regarding the application of the Parry and Kelly model to study the Puncheon Run assemblage is the reliance at Puncheon Run on small cobbles. The distinction between cores and bifaces, so important to Parry and Kelly's analysis, assumes that bifaces will generally be made from flakes. The evidence from the Puncheon Run Site, however, indicates that the primary mode of bifacial tool reduction was the reduction of cobbles, as is common throughout the Middle Atlantic region (Callahan 1979). It is not at all clear that models developed for a flake core technology will apply to a cobble reduction technology like the one used at Puncheon Run. At Puncheon Run, what we call a core may have been the first stage of a bifacial tool, and the distinction between a core and an early-stage biface can be very difficult to draw.

It is also possible that the differences in the number of bifaces found on sites could be related to site function as well as to the overall degree of sedentism in the culture. Even the most sedentary Woodland II peoples used some bifaces, especially arrow points, and comparison of the Woodland II Hughes-Willis, Indian Point, and Townsend sites suggests that bifaces are much more common at fall hunting camps than at villages or shellfish-gathering sites (see Chapter II). Since Puncheon Run seems to represent several different kinds of camps or processing areas, comparisons between the different areas of the site, and with other sites, may be complicated by these functional variations.

Examination of the cores as a class suggests a reliance on expedient technology both at the Cobble Bar area and across the entire Puncheon Run Site. Expedient, unprepared cores made up 90 percent of the Puncheon Run Site assemblage and 92 percent of the Cobble Bar area assemblage (Table 19). Tested cobbles were the most common core type. Although the name "tested cobble" implies that the rock had one or more flakes struck off to examine the quality of the material and was then rejected, people using an expedient technology could have certainly used those flakes. Freehand cores, which result when flakes are struck in an almost random fashion off a core held in the hand, were the next most common type, followed by bipolar cores. Bipolar reduction is performed by placing the core on an anvil stone and then striking it with a second stone, resulting in a core that has had flakes removed from both ends.

TABLE 19: CORE TYPES AND RAW MATERIALS FROM THE PUNCHEON RUN SITE

TABLE 13. CORE TYPES AND RAW MATERIALS FROM THE PUNCHEDON RUN SITE							
CORE TYPE	RAW MATERIAL						TOTAL
	Chert	Jasper	Rhyolite	Quartz	Quartzite	Other	
Expedient							
Freehand Core	15	14	1	30	16	3	79
Bipolar Core	9	13	.	4	3	.	29
Tested Cobble	32	17	1	68	73	3	194
Prepared							
Flake Core	1	1	.	5	1	.	8
Bifacial Core	3	1	.	5	1	.	10
Other Core	7	6	.	2	4	.	19
TOTAL	67	52	2	114	98	6	339

A second measurement used by Parry and Kelly is the ratio of bifaces to cores, which varies widely across the Puncheon Run Site (Table 20). The site as a whole had a rather low biface to core ratio, and the Cobble Bar area had the lowest ratio of all excavated areas. The Metate block (discussed below, Section E.2) had the highest ratio. The distinctive characteristics of the Cobble Bar and Metate block assemblages may be related to both long-term cultural change and the particular tasks carried out in these areas. The Metate block is the oldest part of the Puncheon Run Site, dating to 2800 to 1200 BC, and the lower ratios in the other, later parts of the site may indicate a slowly increasing degree of sedentism through the Woodland I period. However, the Metate block may also have been functionally distinctive, and the large number of narrow-bladed, stemmed projectile points found there is probably related as much to its hypothesized function as a fish processing camp as to its early date. The lowest ratio is found in the Cobble Bar area, where it is clearly related to that area's function as a quarry reduction area. The nearby deposits in the Buried Plowzone area, of approximately the same date range, showed a much higher ratio. Even the ratio in the Cobble Bar area was much less than those reported by Parry and Kelly from truly sedentary groups; in fact, all of the ratios at Puncheon Run, except that in the Metate block, fall between those cited for fully mobile Archaic groups and those found in village sites. Because it is not clear whether tested cobbles have an equivalent in lithic technologies based on primary stone, the biface to core ratio is also given with tested cobbles excluded.

TABLE 20: BIFACE TO CORE RATIOS AT THE PUNCHEON RUN SITE

Artifact Type	Metate	Fea. 30	Other Locus 3	Buried Plzne.	Cobble Bar	Silo Pit	Locus 2	Total Site
Core Frequencies	28	30	70	65	104	13	16	336
Biface Frequencies	66	27	37	42	15	8	14	232
Biface/Core Ratio	2.36	0.90	0.53	0.65	0.14	0.62	0.88	0.69
Ratio Excluding Tested Cobbles	4.13	1.42	1.09	1.50	0.45	2.67	2.33	1.96

A final measurement employed by Parry and Kelly is the ratio of formal to informal tools. Formal tools include bifaces and scrapers, and informal tools include utilized flakes, retouched flakes, and hammerstones. A heavy reliance on formal tools, in this model, implies a high degree of mobility, and a more sedentary people will use mostly informal tools. A difficulty with computing this ratio is that utilized flakes are hard to identify with a simple visual inspection; only microscopic examination of the edge can show definitively whether a flake was used as a tool. Since only a very small portion of the flakes from Puncheon Run were examined in this way, the count of utilized flakes may be far too low; despite this problem, the ratios from Puncheon Run are uniformly high (Table 21). Even the lowest ratio on the site, recorded in the Cobble Bar area, is higher than most of those cited by Parry and Kelly.

An analysis of the Puncheon Run assemblage in the terms proposed by Parry and Kelly produces equivocal results. The cores from the site were generally not standardized and show no sign of preparation, which is a characteristic of an expedient industry, but the ratio of formal tools to utilized

TABLE 21: RATIOS OF FORMAL TO INFORMAL TOOLS AT THE PUNCHEON RUN SITE

Artifact Type	Metate	Fea. 30	Other Locus 3	Buried Plzne.	Cobble Bar	Silo Pit	Locus 2	Total Site
Formal Tools	69	33	42	42	15	8	14	238
Informal Tools	13	12	14	5	10	2	8	67
Formal/Informal Tool Ratio	5.31	2.75	3.00	8.40	1.50	4.00	1.75	3.55

flakes is very high, a characteristic of a curated industry. Biface to core ratios fall generally in the middle range of those cited by Parry and Kelly, although the Metate block produced a rather high ratio. The difficulty in comparing the Puncheon Run assemblage to those from the Midwestern and Southwestern sites cited by Parry and Kelly probably stems from the difference between the cobble-based industries of the Coastal Plain vis-à-vis industries based on locally available primary sources. Since the ratio of formal to informal tools is the measurement least likely to be effected by the difference in technologies, perhaps it is most relevant to the present analysis. Clearly the residents of Puncheon Run used large numbers of bifacial tools, suggesting a fairly high degree of mobility.

e. Summary

Exploration of the Cobble Bar area was limited by the practical consideration that most of this deposit was ultimately determined to be outside the project limit and therefore unavailable for Phase III data recovery. The deposit extended into the project area in two places, adjacent to the Buried Plowzone area and 50 meters to the east, where the Cobble Bar area excavations took place. Taking the deposits from these two areas together, much can be learned about the use of these cobble bars as a source of stone for tools. The Marcey Creek and Selden Island ceramics in the Buried Plowzone area and the fishtail point from the Cobble Bar area suggest that quarrying had begun by 800 BC, and that it continued into Woodland II times.

The quarrying seems to have been a rather simple operation. Cobbles were collected, and a flake was struck off to see what was inside. Many cobbles were rejected at that point, resulting in the large number of tested cobbles found during the excavations. Some cobbles were reduced further, either by freehand or bipolar techniques. Some cobbles were turned into finished, formal tools, as is indicated by the presence in the Buried Plowzone area of numerous small flakes, as well as early-stage, middle-stage, and late-stage bifaces. In the Cobble Bar area, biface production was not as common, as indicated by the large size of the flakes and the rarity of late-stage bifaces. However, lithic reduction activities were not geared solely to the manufacture of bifaces. A number of utilized flakes were discarded in the Cobble Bar area, which had the highest ratio of expedient to formal tools recorded at the site. The activity for which these tools were used is not known, but this possible processing area may have been related to the storage pits found scattered across the upland portion of Locus 1, especially in the Silo Pit area. Whatever the activity was, the cobble bars along Puncheon Run served as a source of stone for both formal bifacial tools, which were then carried away, and expedient flake tools, which were used on the site and then discarded.